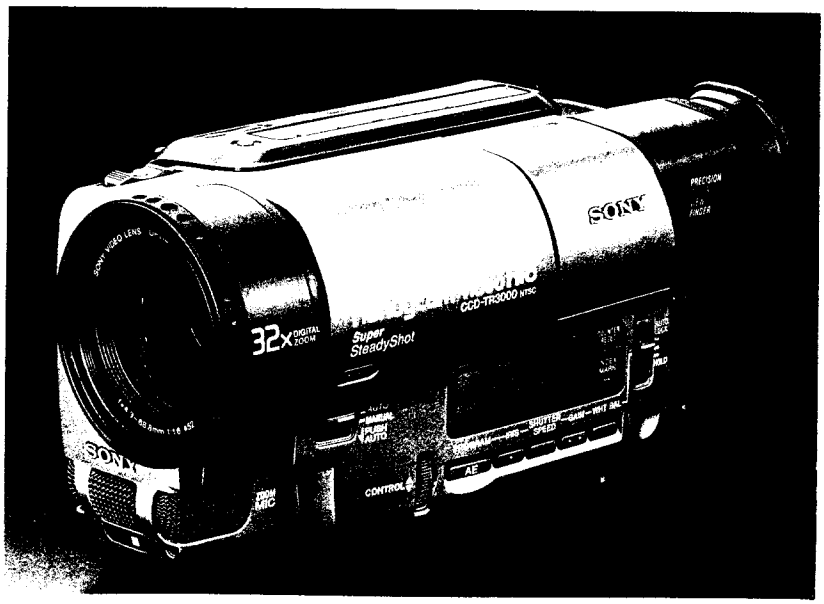
SONY

3-800-030-**21** (1)

# *Video Camera Recorder* Hi8

Operation Manual




*CCD-TR3000* video Hi8 Handycam

© 1995 by Sony Corporation

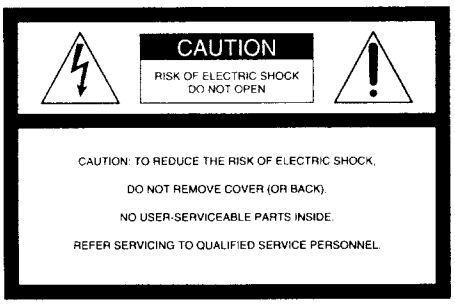
Before operating the unit, please read this manual thoroughly and retain it for future reference.

### Welcome to Video Hi8

Congratulations on your purchase of this Sony Handycam® camcorder. With your Handycam you can capture life's precious moments with superior picture and sound quality.
Your Handycam is loaded with advanced features, but at the same time it is very easy to use. You will soon be producing home video that you can enjoy for years to come.

## WARNING

## To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

### DISPOSAL OF LITHIUM ION BATTERY.

**LITHIUM ION BATTERY.**
**DISPOSE OF PROPERLY.**

You can return your unwanted lithium ion batteries to your nearest Sony Service Center or Factory Service Center.

**Note:** In some areas the disposal of lithium ion batteries in household or business trash may be prohibited.

For the Sony Service Center nearest you call 1-800-222-SONY (United States only)
For the Sony Factory Service Center nearest you call 416-499-SONY (Canada only)

**Caution:** Do not handle damaged or leaking lithium ion battery.

## For Customers in the U.S.A.

**Note:**
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

## Owner's Record

The model and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to them whenever you call upon your Sony dealer regarding this product.

Model No. CCD-TR3000 Serial No. _____
Model No. AC-V515 Serial No. _____

## For Customers in CANADA

CAUTION

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED AC PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

# Table of Contents


**Before You Begin**
Notes and Precautions 4
Checking Supplied Accessories 5

**Getting Started**
Charging and Installing the Battery Pack 6
Inserting a Cassette 8

**Basic Operations**
Camera Recording 9
Using the Zoom Feature 11
Hints for Better Shooting 12
Checking the Recorded Picture 13
Connections for Playback 14
Playing Back a Tape 17
Displaying the Date or Time When You Recorded — Data Code Function 19
Searching for the End of the Picture 20

**Advanced Operations**
Using Alternative Power Sources 21
Using House Current 21
Changing the Mode Settings 23

**— for Camera Recording —**
Fade-in and Fade-out 25
Enjoying Picture Effect 26
Recording with the Date or Time 27
Re-recording a Picture in the Middle of a Recorded Tape 28
Releasing the STEADYSHOT Function 29

**— for Manual Adjustment —**
Selecting Automatic/Manual Adjustment Modes 30
Focusing Manually 31
Using the PROGRAM AE Function 32
Using the Aperture Priority Mode 33
Using the Shutter Priority Mode 34
Using the Twilight Mode 35
Using Manual Mode 35
Tips for Manual Adjustment 38
Adjusting the Brightness of the Picture 40
Adjusting the White Balance 41

**— for Playing Back/Editing —**
Returning to a Pre-registered Position 43
Locating the Marking Position 44
Writing the RC Time Code on a Recorded Tape 48
Editing onto Another Tape 49
Recording from a VCR or TV 51

**Additional Information**
Changing the Lithium Battery in the Camcorder 53
Resetting the Date or Time 54
Playback Modes 55
Tips for Using the Battery Pack 56
Maintenance Information and Precautions 58
Using Your Camcorder Abroad 61
Trouble Check 62
Specifications 66
Identifying the Parts 67
Warning Indicators 75
Index (Back Cover)

Before You Begin

# Notes and Precautions

As you read through this manual, buttons and settings on the camcorder are shown in capital letters.
e.g. Set the POWER switch to CAMERA.

## Note on TV Color Systems

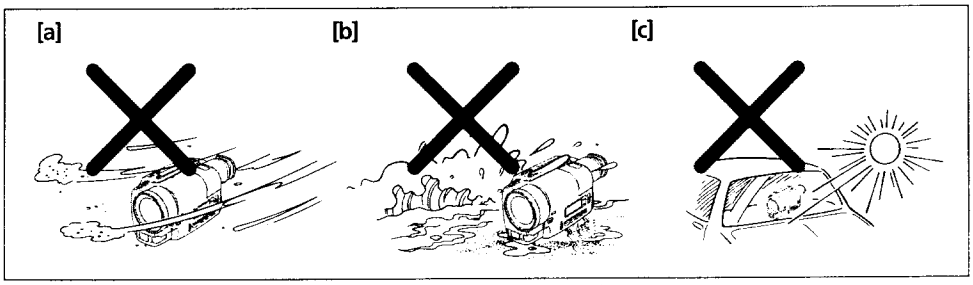
TV color systems differ from country to country. To view your recordings on a TV, you need an NTSC system-based TV. Please check the list on page 61 to find out the TV color system used in your country.

## Precaution on Copyright

Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

## Precautions on Camcorder Care

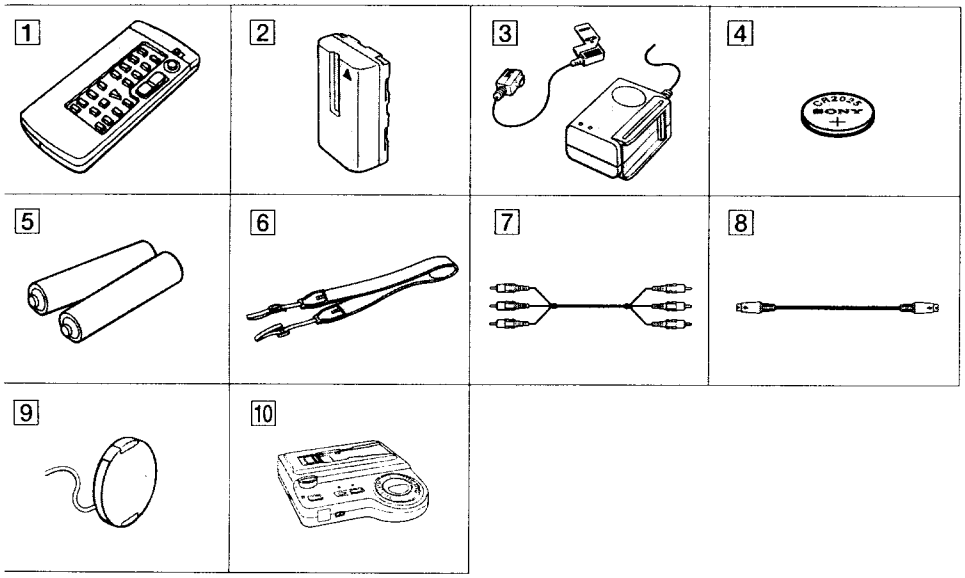
- **Do not let sand get into the camcorder. When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired [a].**
- **Do not let the camcorder get wet. Keep the camcorder away from rain and sea water. Letting the camcorder get wet may cause the unit to malfunction and sometimes the malfunction cannot be repaired [b].**
- **Never leave the camcorder exposed to temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight [c].**




Contents of the recording cannot be compensated if recording or playback is not made due to a malfunction of the camcorder, video tape, etc.

# Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.




1 **Wireless Remote Commander** (1) (p. 71)
2 **NP-520 Battery pack** (1) (p. 6)
3 **AC-V515 AC power adaptor** (1) (p. 6, 21)
4 **CR2025 Lithium Battery** (1) (p. 53)
(The lithium battery is already installed in your camcorder.)
5 **Size AA (R6) battery for Remote Commander** (2) (p. 71)
6 **Shoulder strap** (1) (p. 73)
7 **A/V connecting cable** (1) (p. 14, 15)
8 **S video connecting cable** (1) (p. 14, 15)
9 **Lens cap** (1) (p. 9)
0 **HSA-V515 Handycam Station** (1) (p. 15)
(For Canadian model only.)

Getting Started

# Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge and install the battery pack. To charge the battery pack, use the supplied AC-V515 AC power adaptor.

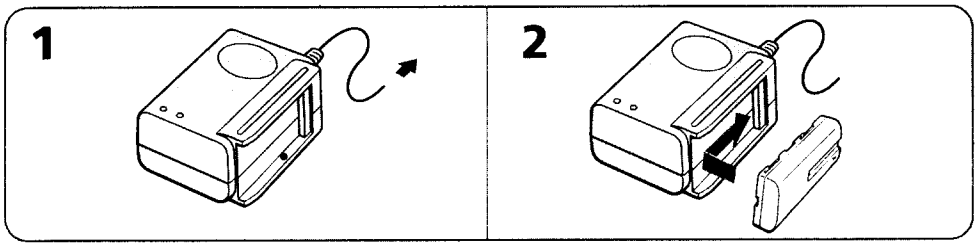
## Charging the Battery Pack

Charge the battery pack on a flat surface without vibration.

(1) Connect the power cord to a wall outlet.

(2) Align the surface of the battery pack indicated by the ▶ mark with the edge of the terminal shutter of the AC power adaptor. Then fit and slide the battery pack in the direction of the arrow. The CHARGE lamp (orange) lights up. Charging begins.

When charging is completed, the CHARGE lamp goes out. Unplug the unit from the wall outlet, then remove the battery pack and install it into the camcorder. You can also use the battery pack before it is completely charged.




### Charging Time

| Battery pack | NP-520 (supplied) | NP-500H | NP-720 |
|---|---|---|---|
| Charging time* | 110 | 100 | 190 |

* Approximate minutes to charge an empty battery pack using the AC-V515. (Lower temperatures require a longer charging time.)

To use the NP-720 battery pack, you have to use the NPA-L1 battery adaptor (not supplied) (p. 22).

### Battery Life

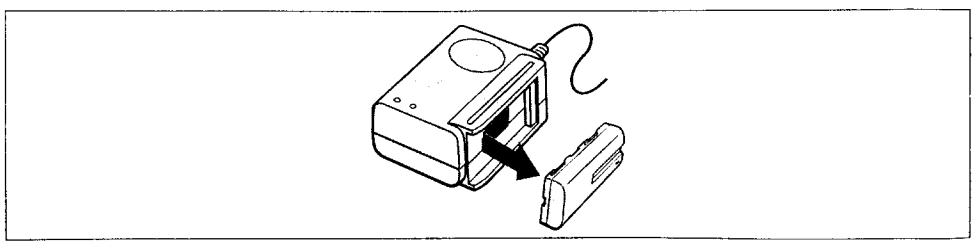
| Battery pack | NP-520 (supplied) | NP-500H |
|---|---|---|
| Typical recording time** | 35 | 30 |
| Continuous recording time*** | 70 | 60 |

** Approximate minutes when recording while you repeat recording start/stop or zooming and turning the power on/off. The actual battery life may be shorter.

*** Approximate continuous recording time indoors.

### To Remove the Battery Pack

Slide the battery pack in the direction of the arrow.

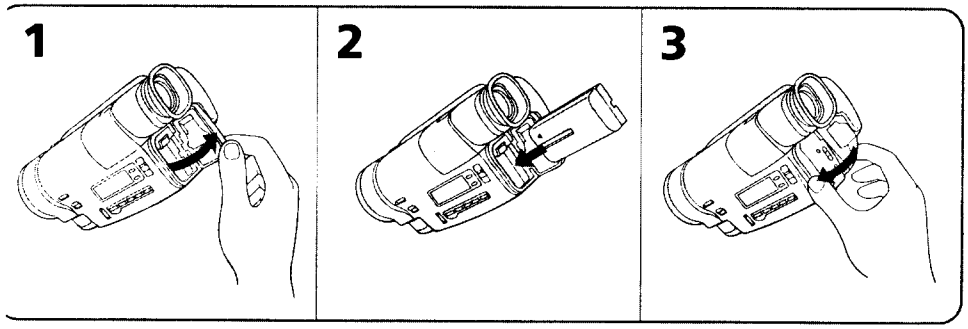


**Notes on charging the battery pack**

- The CHARGE lamp will remain lit for a while even if the battery pack is removed and the power cord is unplugged after charging the battery pack. This is normal.
- If the CHARGE lamp does not light, disconnect the power cord. After about one minute, reconnect the power cord again.
- You cannot operate the camcorder using the AC power adaptor while charging the battery pack.
- When a fully charged battery pack is installed, the CHARGE lamp will light once, then go out.

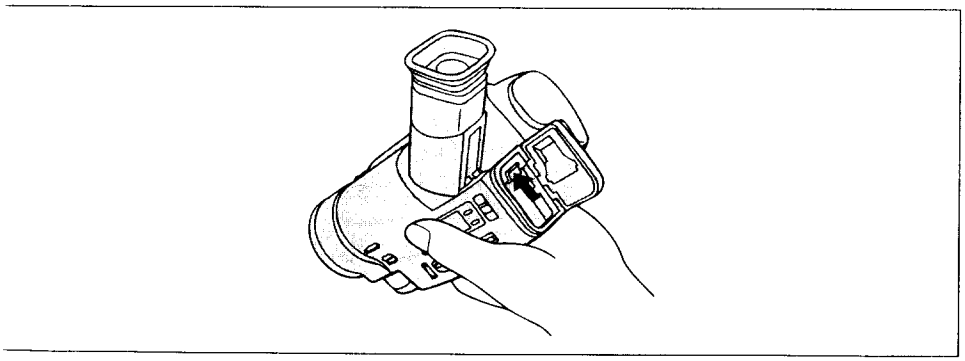
## Installing the Battery Pack

1) Open the lid of the battery compartment.
2) Insert the battery pack in the direction of the ◀ mark until it catches on the battery release lever.
3) Close the lid.




**To Remove the Battery Pack**

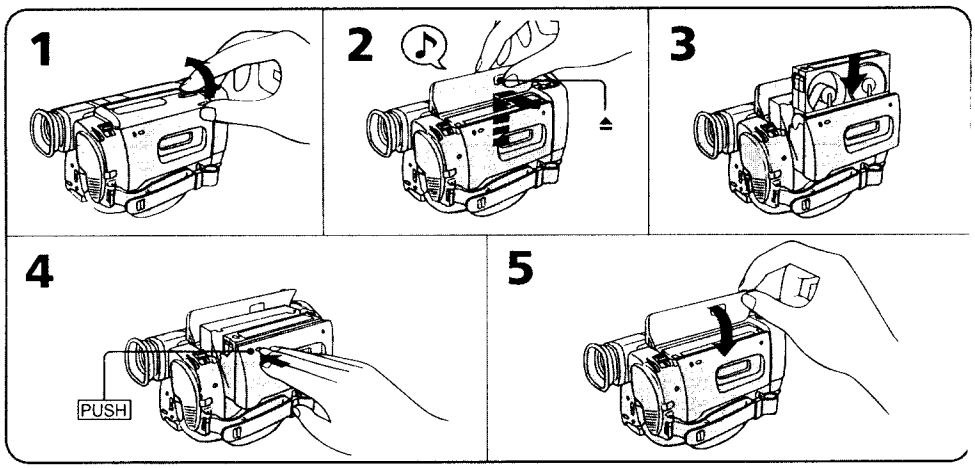
Open the lid of the battery compartment and turn the mouth of the compartment upwards. While lifting the battery release lever, remove the battery pack.



# Inserting a Cassette

Make sure that the power source is installed.
When you want to record in the Hi8 system, use Hi8 video cassette **Hi8**.

**(1)** Lift up the lid.
**(2)** Press ⏏. The cassette compartment automatically lifts up and opens.
**(3)** Insert a cassette with the window facing out.
**(4)** Close the cassette compartment by pressing the "PUSH" mark on the cassette compartment. The cassette compartment automatically goes down.
**(5)** Close the lid.

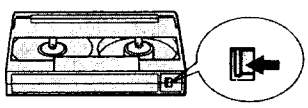



### To Eject the Cassette

Lift up the lid of the cassette compartment and press ⏏.

### To Prevent Accidental Erasure

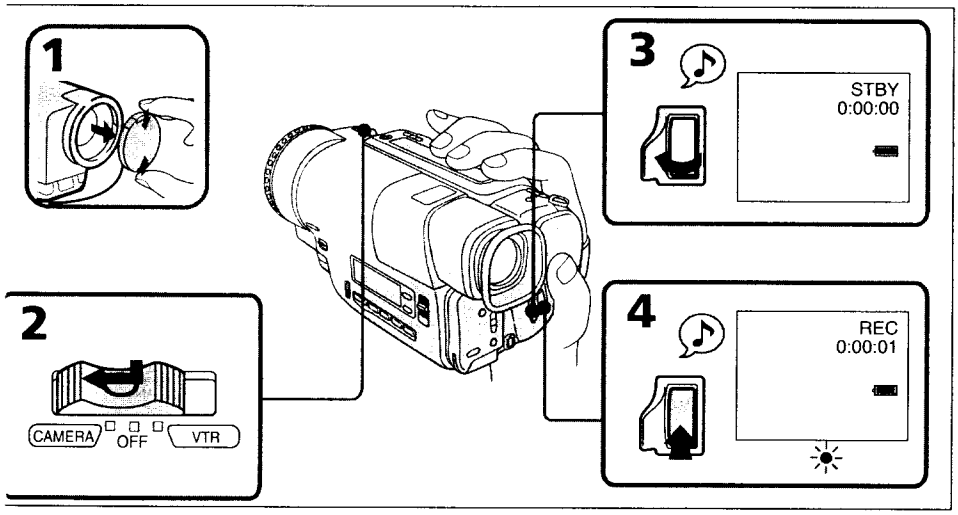
Slide the tab on the cassette to expose the red mark. If you try to record with the red mark exposed, the and ⏏ indicators flash in the viewfinder, and you cannot record.
To re-record on this tape, slide the tab back out covering the red mark.



# Camera Recording

ake sure that the power source is installed and a cassette is inserted.
·fore you record one-time events, you may want to make a trial recording to make sure that the mcorder is working correctly.
› save battery power, the picture in the viewfinder appears only when you bring your face close to e viewfinder with the STANDBY cover open (**Finder power save**).

) Remove the lens cap.
) While pressing the small green button on the POWER switch, slide it to CAMERA.
) Open the STANDBY cover.
) Press START/STOP. The camcorder starts recording. The "REC" indicator appears and the red lamp lights up in the viewfinder. The camera recording/battery lamps located on the front and the rear of the camcorder also light up.

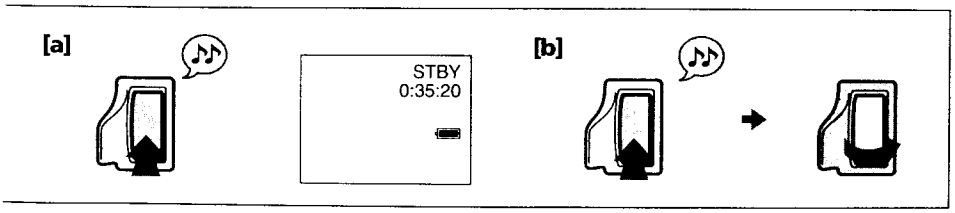



## › Stop Recording Momentarily [a]

ess START/STOP again. The "STBY" indicator appears in the viewfinder (**Standby mode**).

## › Finish Recording [b]

ess START/STOP again. Close the STANDBY cover and slide the POWER switch to OFF. Then, eject ? cassette (p. 8) and remove the battery pack (p. 7).

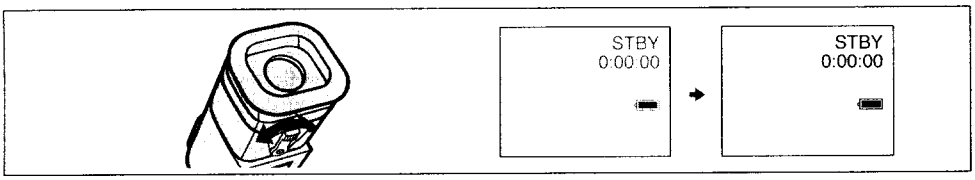



e the next page for further information.

# Camera Recording

## To Focus the Viewfinder Lens

If you cannot see the indicators in the viewfinder clearly, or after someone else has used the camcorder, focus the viewfinder lens.
Move the viewfinder lens adjustment lever so that the indicators in the viewfinder come into sharp focus.




### Note on Standby mode

If you leave the camcorder in Standby mode for 5 minutes while the cassette is inserted, the camcorder turns off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, close the STANDBY cover once and open it again. To start recording, press START/STOP.

### Note on recording

When you record from the beginning of a tape, run the tape for about 15 seconds before starting the actual recording. This will ensure that you won't miss any start-up scenes when you play back the tape.
You can record tapes in SP (standard play) mode only.

### Note on the tape counter

The tape counter indicates the recording or playback time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET.

### Note on beep sound

As indicated with ♪ in the illustrations, a beep sounds when you turn the power on or when you start recording and two beeps sound when you stop recording, confirming the operation. Several beeps also sound as a warning of any unusual condition of the camcorder (p. 75).
Note that the beep sound is not recorded on the tape. If you do not want to hear the beep sound, select "OFF" in the menu system (p. 23).

### Notes on finder power save

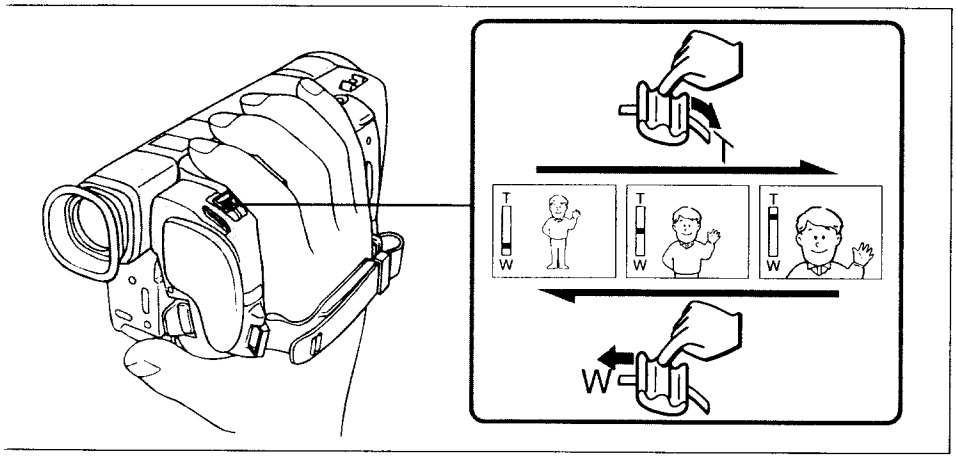
- The recording continues even when the picture in the viewfinder disappears during recording.
- If you set POWER SAVE to OFF, the picture in the viewfinder does not disappear even when you turn your face away from the viewfinder.

### When moving from indoors to outdoors (or vice versa)

Open the STANDBY cover and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

## Using the Zoom Feature

ooming is a recording technique that lets you change the size of the subject in the scene.
or more professional-looking recordings, use the zoom function sparingly.
T" side: for telephoto (subject appears closer)
W" side: for wide-angle (subject appears farther away)






### ooming Speed (Variable speed zooming)

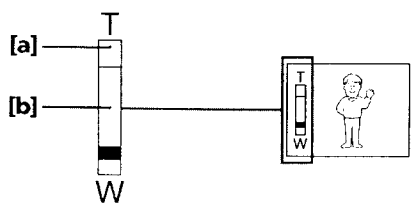
ove the power zoom lever quickly for a high-speed zoom, move it slowly for a relatively slow zoom.

### hen you shoot a subject using a telephoto zoom

you cannot get a sharp focus while in extreme telephoto zoom, move the power zoom lever to the W" side until the focus is sharp. You can shoot a subject that is at least about 3 1/4 feet (100 cm) away om the lens surface in the telephoto position, or about 1/2 inches (1 cm) away in the wide-angle sition.

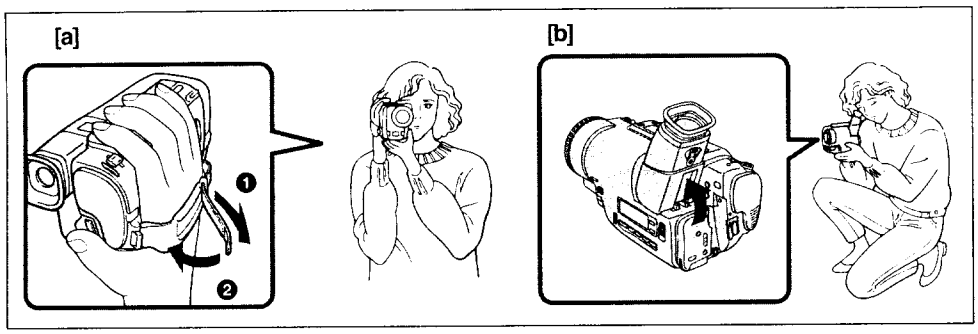
### otes on Digital Zoom

More than 16x zoom is performed digitally, and the picture quality deteriorates as you go toward the "T" side. If you do not want to use the digital zoom, set the D ZOOM function to OFF in the menu system (p. 24).
The horizontal bar in the power zoom indicator separates the digital zooming zone (above the bar **[a]**) and the optical zooming zone (under the bar **[b]**). If you set the D ZOOM function to OFF, the part above the bar disappears.



# Hints for Better Shooting

For hand-held shots, you'll get better results by holding the camcorder according to the following suggestions:




- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb **[a]**.
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it. Be sure to not touch the built-in microphone.
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can also record in a low position to get an interesting recording angle. Lift the viewfinder up for recording from a low position **[b]**.

### Place the camcorder on a flat surface or use a tripod

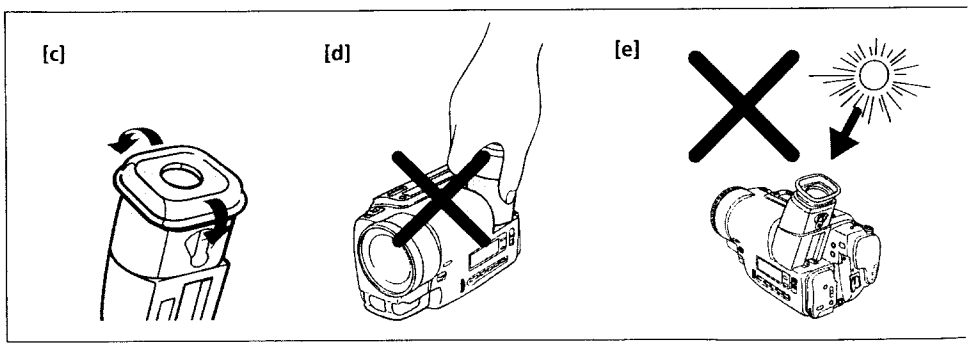
Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder (p. 69).
When attaching a non-Sony tripod, make sure that the length of the tripod screw is less than 9/32 inches (6.5 mm). Otherwise, the screw may damage the inner parts of the camcorder.

### If you wear glasses

You can bend back the eyecup to get a better view of viewfinder **[c]**.

### Cautions on the viewfinder

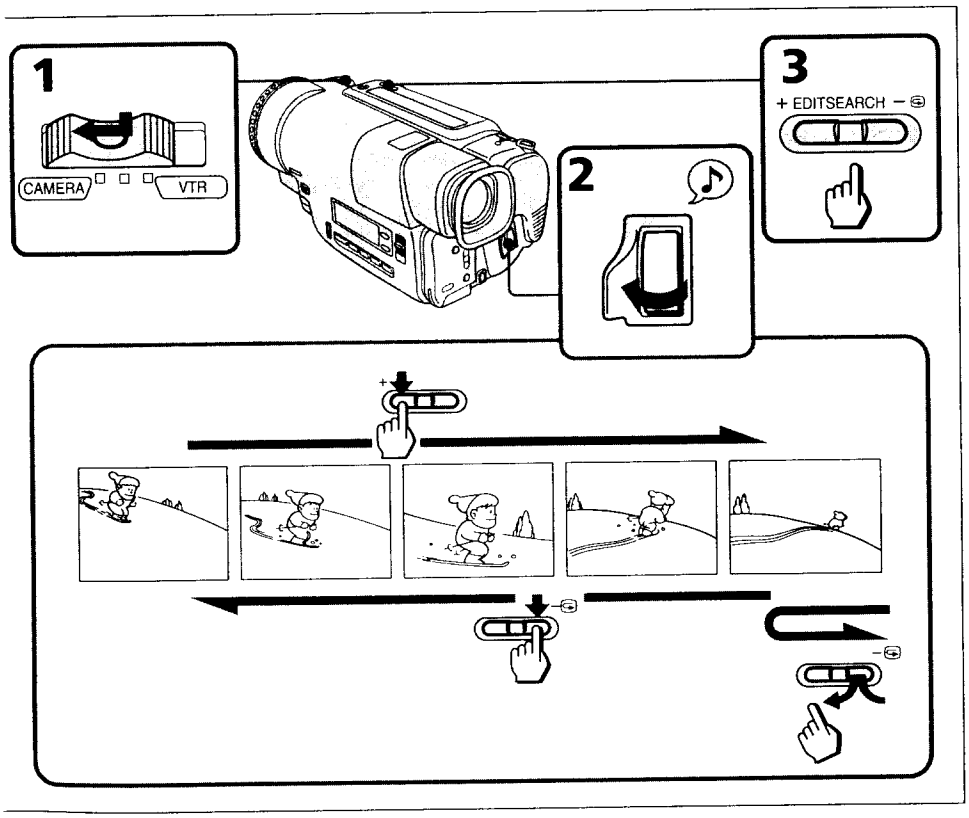
- Do not pick up the camcorder by the viewfinder **[d]**.
- Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder may be deformed. Be careful when placing the camcorder under sunlight or by the window **[e]**.



# Checking the Recorded Picture

sing EDITSEARCH, you can review the last recorded scene or check the recorded picture in the ewfinder.

) While pressing the small green button on the POWER switch, slide it to CAMERA.
) Open the STANDBY cover.
) Press the – (⏪) side of EDITSEARCH momentarily; the last few seconds of the recorded portion plays back (**Rec Review**). Hold down the – side of EDITSEARCH until the camcorder goes back to the scene you want. The last recorded portion is played back. To go forward, hold down the + side (**Edit Search**).




### To Stop Playback

Release EDITSEARCH.

### To Go Back to the Last Recorded Point After Edit Search

Press END SEARCH. The last recorded point is played back for about 5 seconds and stops.
Note that this function does not work once you eject the cassette after you recorded in the tape.

### Begin Re-recording

START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do the tape, the transition between the last scene you recorded and the next scene you record will h.

### tor the Sound While Viewing the Playback Picture in the Viewfinder

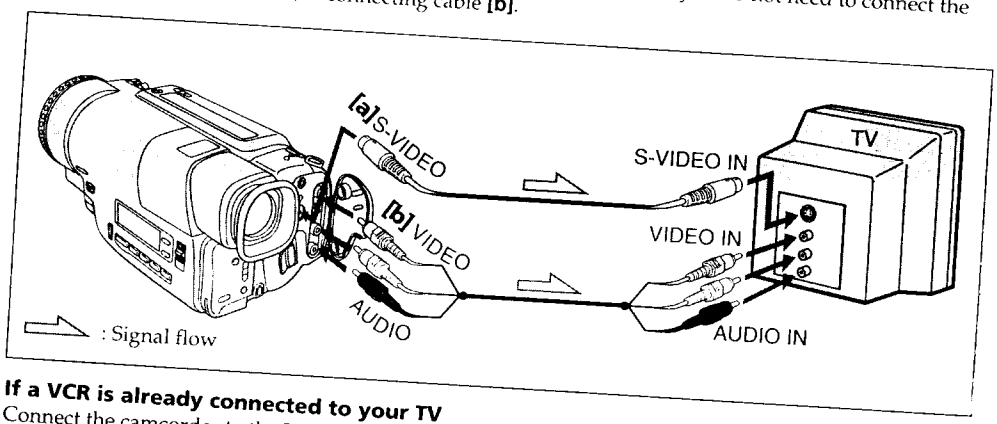
adphones (not supplied) to the 🎧 jack. Play back the tape in VTR mode (p. 17).

# Connections for Playback

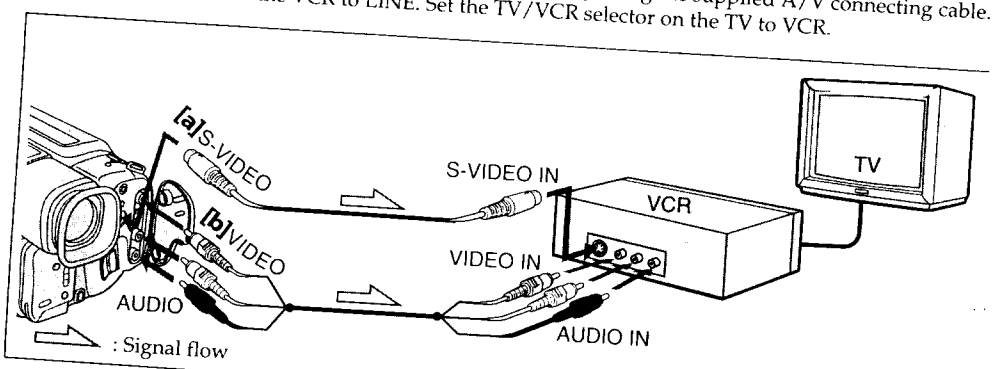
You can use this camcorder as a VCR by connecting it to your TV for playback. There are some ways to connect the camcorder to your TV. When monitoring the playback picture by connecting the camcorder to your TV, we recommend you to use house current for the power source (p. 21).

## Connecting Directly to a TV

Open the jack cover and connect the camcorder to the inputs on the TV by using the supplied A/V connecting cable. Set the TV/VCR selector on the TV to VCR.
If you are going to connect the camcorder using the S video cable **[a]**, you do not need to connect the yellow (video) plug of the A/V connecting cable **[b]**.




**If a VCR is already connected to your TV**
Connect the camcorder to the LINE IN inputs on the VCR by using the supplied A/V connecting cable. Set the input selector on the VCR to LINE. Set the TV/VCR selector on the TV to VCR.




**If your TV or VCR is a monaural type**
Connect only the white plug for audio on both the camcorder and the TV or the VCR. With this connection, the sound is monaural.

**To connect to a TV or VCR without Video/Audio input jacks**
Use the RFU-95UC RFU adaptor (not supplied).

## Connecting to a TV Using the Handycam Station

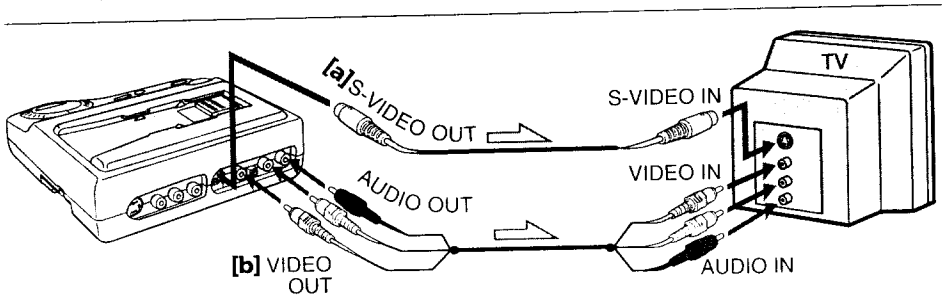
### For Canadian model only

ıce you connect the supplied HSA-V515 Handycam Station to your TV or VCR, you can easily view e picture on your TV.

### ɔ Connect the Handycam Station to a TV

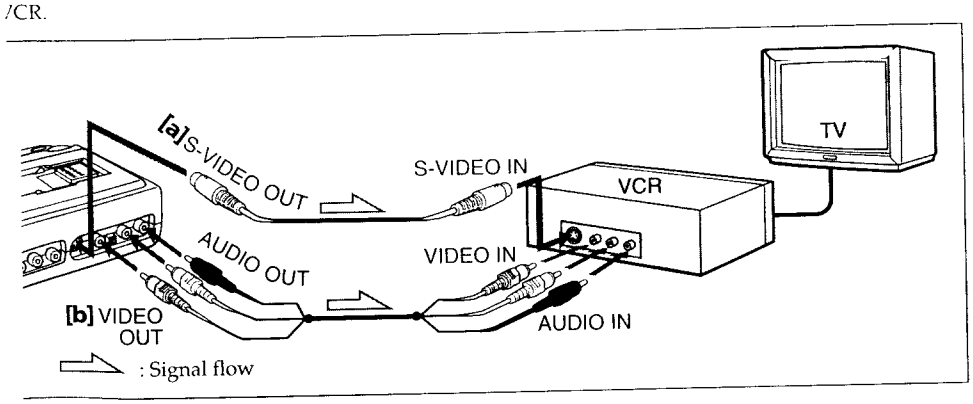
ɔnnect the Handycam Station to the inputs on the TV using the supplied A/V connecting cable. Set ıe TV/VCR selector on the TV to VCR.

you are going to connect the Handycam Station using the S video cable **[a]**, you do not need to ɔnnect the yellow (video) plug of the A/V connecting cable **[b]**.




### f your TV is already connected to a VCR

ɔnnect the Handycam Station to the LINE IN inputs on the VCR by using the supplied A/V ɔnnecting cable. Set the input selector on the VCR to LINE. Set the TV/VCR selector on the TV to /CR.




### your TV or VCR is a monaural type

nect only the white plug for audio on both the Handycam Station and the TV or VCR. With this tion, the sound is monaural.

### ect to a TV or VCR without Video/Audio input jacks

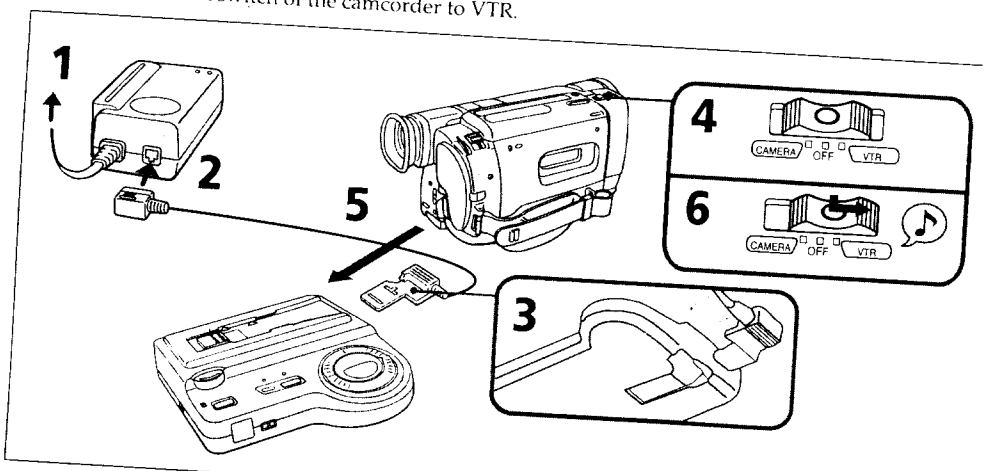
U-95UC RFU adaptor (not supplied).

page for further information.

## Connections for Playback

### To Connect the Camcorder to the Handycam Station

(1) Connect the power cord of the supplied AC power adaptor to a wall outlet.
(2) Connect the supplied connecting cord to the DC OUT jack on the AC power adaptor.
(3) Insert the connecting plate into the guides at the bottom of the Handycam Station.
(4) Set the POWER switch of the camcorder to OFF.
(5) Aligning the bottom of the camcorder with the arrow mark on the Handycam Station, slide the camcorder along the guide until it clicks.
(6) Set the POWER switch of the camcorder to VTR.



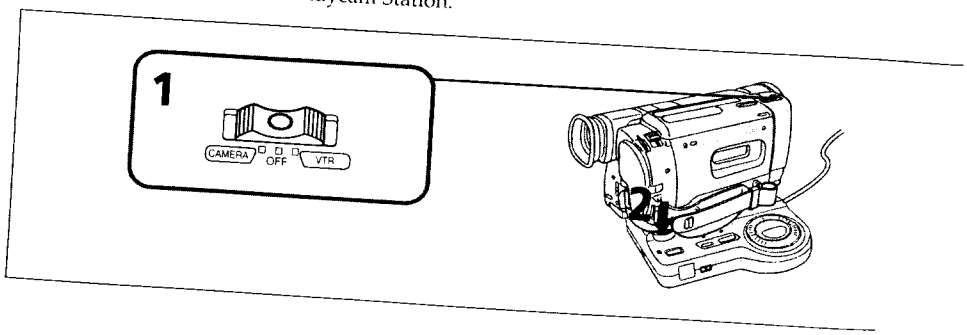

You can charge the battery pack installed in the camcorder by connecting the AC power adaptor to th Handycam Station and setting the HANDYCAM POWER switch to OFF. The CHARGE lamp lights u and goes out when charging is completed. Charging time of the supplied NP-520 battery pack is approx. 2 hours and 30 minutes.

**Caution**

Do not set the POWER switch to CAMERA. The Handycam Station can be used only for VTR mode.

**To remove the camcorder**

(1) Set the POWER switch of the camcorder to OFF.
(2) Press RELEASE on the Handycam Station.



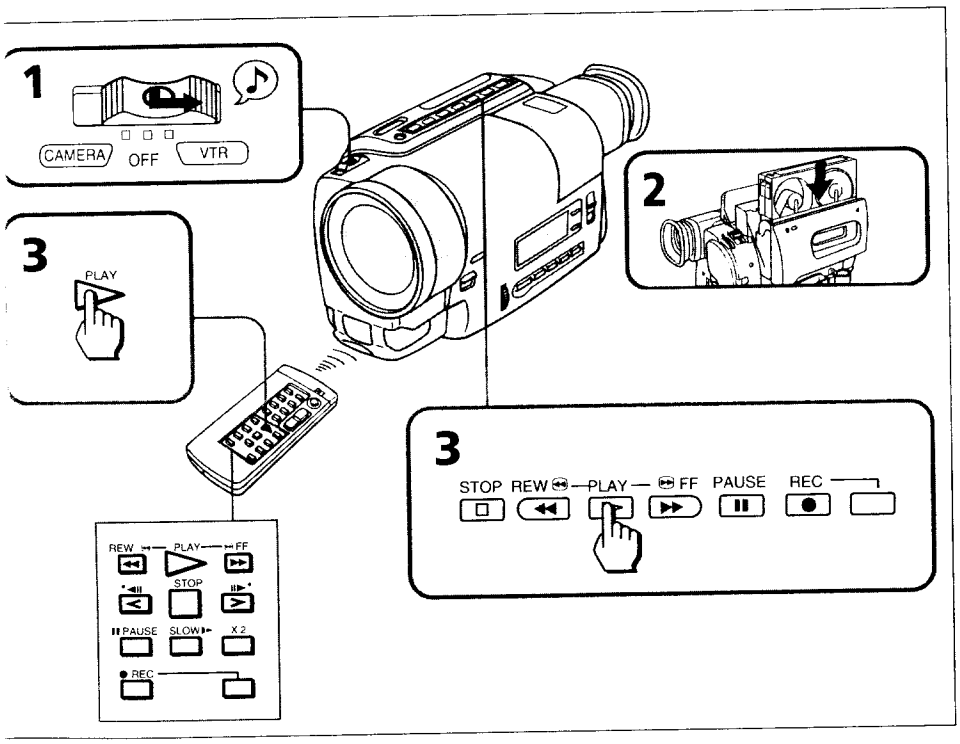
# ?laying Back a Tape

ı can monitor the playback picture in the viewfinder. You can also monitor the picture on a TV
een, after connecting the camcorder to a TV or VCR (p. 14 – 16).

While pressing the small green button on the POWER switch, slide it to VTR. The tape transport buttons light up.

Insert the recorded tape with the window facing out.

Press ▷ to start playback.




**o stop playback,** press □.
**o rewind the tape,** press ◀◀.
**o advance the tape rapidly,** press ▶▶.

## ısing the Remote Commander

ou can control playback using the supplied Remote Commander. Before using the Remote ommander, insert the size AA (R6) batteries and slide the HOLD switch in the opposite direction to ıe arrow.

## sing the Handycam Station — For Canadian model only

ı control playback using the buttons and shuttle ring on the Handycam Station. To use the ing, turn the shuttle ring clockwise or counterclockwise to point the desired indication around Vhen using the Remote Commander with the Handycam Station, set COMMAND MODE on am Station to VTR 2.

### the Viewfinder Screen Indicators on the TV

Y on the Remote Commander. To erase the indicators, press DISPLAY again.

ge for further information.

# Playing Back a Tape

## Various Playback Modes

### To View a Still Picture (Playback pause)

Press ❚❚ during playback. To resume playback, press ❚❚ or ▷.

### To Locate a Scene (Picture search)

Keep pressing ◀◀ or ▶▶ during playback. To resume normal playback, release the button.

### To Monitor the High-speed Picture While Advancing the Tape or Rewinding (Skip scan)

Keep pressing ◀◀ while rewinding or ▶▶ while advancing the tape. To resume normal playback, press ▷.

### To View the Picture in a Sequence of Stop-motion Images

Press EDITSEARCH in Playback pause mode. If you keep pressing EDITSEARCH, you can view the picture play back in the forward (+) or reverse (–) direction.

### To View the Picture at 1/5 Speed (Slow playback)

Press ❚► on the Remote Commander during playback. To resume normal playback, press ►. If slow playback lasts for about 1 minute, it shifts to normal speed automatically.

### To View the Picture at Double Speed

For double speed playback in the reverse direction, press <, then press x2 on the Remote Commande during playback. For double speed playback in the forward direction, press >, then press x2 during playback. To resume normal playback, press ►.

### To View the Picture Frame-by-Frame

Press ◀❚❚ or ❚❚► on the Remote Commander in playback pause mode. If you keep pressing the button you can view the picture at 1/25 speed. To resume normal playback, press ►.

### To Change the Playback Direction

Press < on the Remote Commander for reverse direction or > on the Remote Commander for forward direction during playback. To resume normal playback, press ►.

### To Select the Playback Sound

Change the "HiFi SND" mode setting in the menu system (p. 24).

### Notes on playback

- Streaks appear and the sound is muted in the various playback modes.
- When playback pause mode lasts for 5 minutes, the camcorder automatically enters stop mode.
- Horizontal noise appears at the center of the screen when you play back a tape in reverse if the RC time code or the Data Code is displayed on the screen. This is normal.

## )isplaying the Date or Time When You Recorded — Data Code 'unction

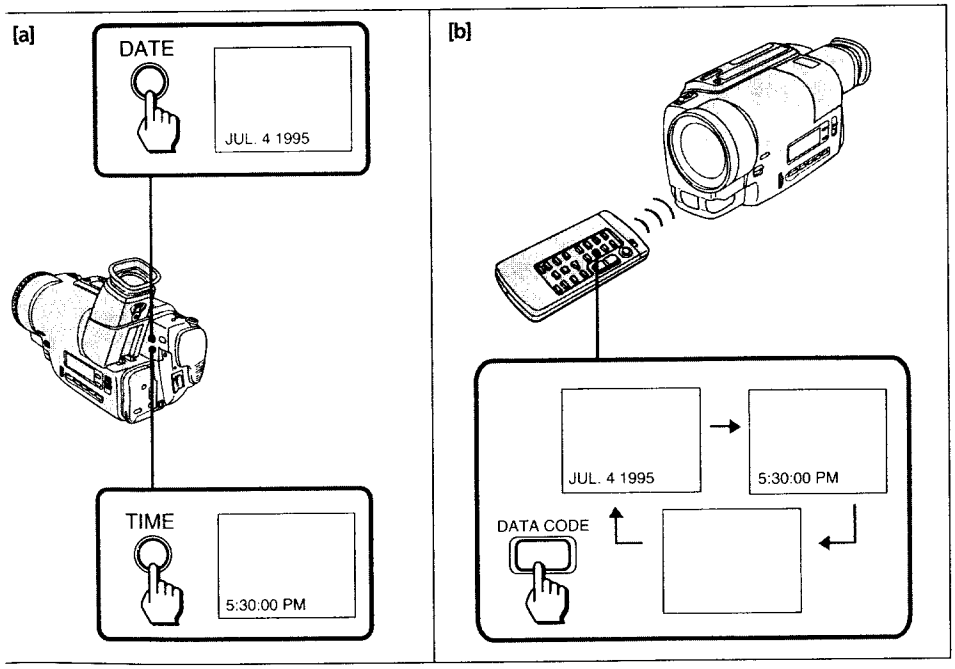
:n if you did not record the date or time when you were recording, you can display the date or time ıen you recorded (Data Code) on the TV during playback or editing. The Data Code is also displayed the viewfinder and the display window.

### › Display the Date When You Recorded

:ss DATE on the camcorder **[a]**, or press DATA CODE on the Remote Commander **[b]**. To make the te disappear, press DATE again or DATA CODE twice.

### › Display the Time When You Recorded

:ss TIME on the camcorder **[a]**, or press DATA CODE on the Remote Commander twice **[b]**. To ıke the time disappear, press it again.



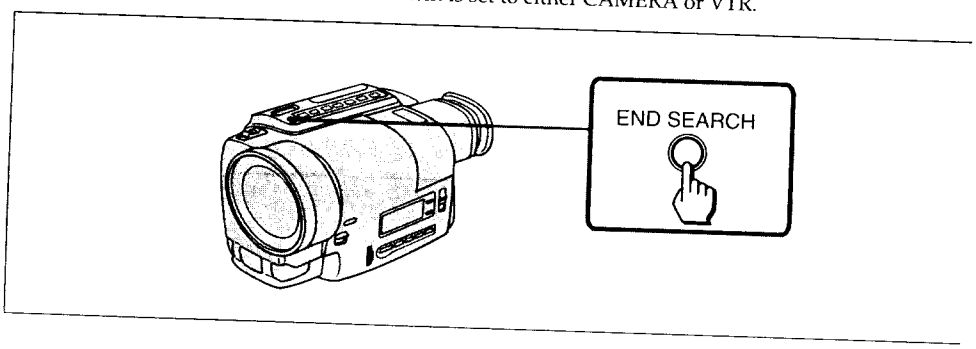

### /hen bars (--:--:--) appear

A blank portion of the tape is being played back.
The tape was recorded by a camcorder without the Data Code function.
The tape was recorded by a camcorder without having date and time set.
tape is unreadable due to tape damage or noise.
pe was recorded in LP mode.
: is being played back in variable speed (Slow Playback, etc.)
signal is marked, the RC time code is written, or PCM after recording is made on the tape.

# Searching for the End of the Picture

You can go to the end of the recorded portion after you record and play back the tape to make the transition between the last scene you recorded and the next scene smooth. The tape starts rewinding or fast-forwarding and the last 5 seconds of the recorded portion plays back. Then the tape stops at the end of the recorded picture (**End Search**).
Note that End Search function does not work once you eject the cassette after you recorded in the tape.

Press END SEARCH.
This function works when the POWER switch is set to either CAMERA or VTR.



# Using Alternative Power Sources

u can choose any of the following power sources for your camcorder: battery pack (p. 6), house rent, and 12/24 V car battery. Choose the appropriate power source depending on where you want ıse your camcorder.

| Place | Power source | Accessory to be used |
|---|---|---|
| Indoors | House current | AC power adaptor AC-V515 (supplied) |
| | | Handycam Station HSA-V515 (supplied for Canadian model only)* |
| Outdoors | Battery pack | Battery pack NP-520 (supplied), NP-500H, NP-720** |
| In the car | 12 V or 24 V car battery | Car battery charger DC-V515 |

Handycam Station HSA-V515 cannot be used for camera recording.
Battery pack NP-720 can be used only with the NPA-L1 battery adaptor (not supplied).

**te on power sources**

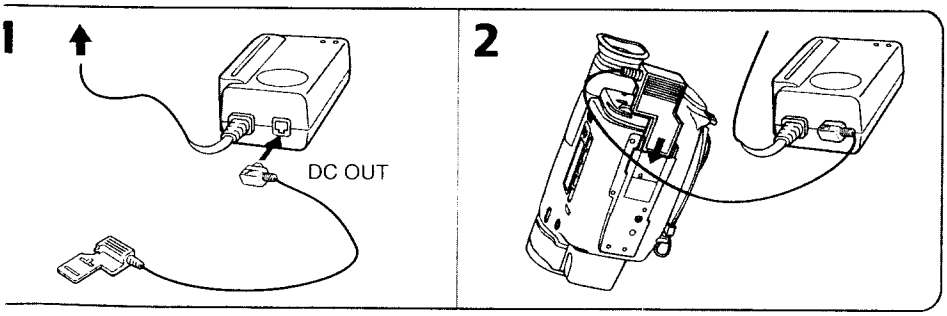
connecting the power source or removing the battery pack during recording or playback may nage the inserted tape. If this happens, restore the power supply again immediately.

## Using House Current

use the supplied AC-V515 AC power adaptor:

Connect the AC power cord to a wall outlet, then connect the connecting cord to the DC OUT jack on the AC power adaptor.

Insert the connecting plate into the guides at the bottom of the camcorder.




ı can charge the battery pack installed in the camcorder by connecting the AC power adaptor to the ncorder and setting the POWER switch to OFF. The CHARGE lamp lights up, and goes out when rging is completed. Charging time of the supplied NP-520 battery pack is approx. 2 hours and minutes.

**remove the connecting plate**

l out the connecting plate by the plate. Never pull the connecting cord itself.

**ARNING**

power cord must only be changed at qualified service shop.

**ECAUTION**

set is not disconnected from the AC power source (mains) as long as it is connected to the ll outlet, even if the set itself has been turned off.

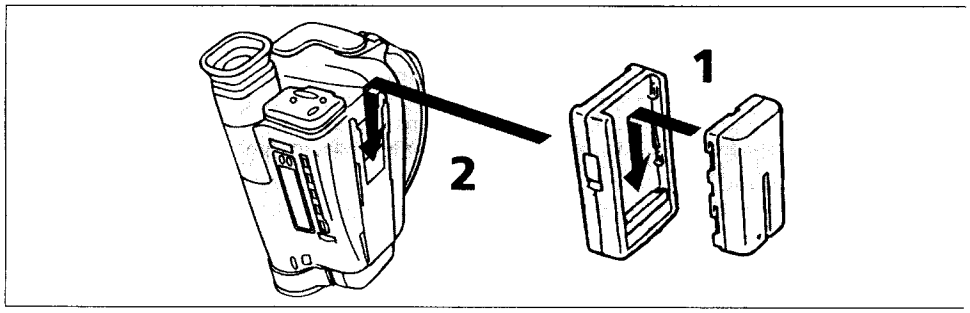
the next page for further information.

# Using Alternative Power Sources

## Installing the Battery Pack at the Bottom of the Camcorder

You can install the battery pack at the bottom of the camcorder with the NPA-L1 battery adaptor (not supplied). If you install another battery pack into the camcorder, you can use the camcorder for a long time.

(1) Attach the battery pack to the battery adaptor until it clicks.
(2) Aligning the bottom of the battery adaptor with the guide at the bottom of the camcorder, slide the battery adaptor until it clicks.




### Battery life of NP-720

The typical recording time of the NP-720 battery pack (not supplied) is approx. 1 hour and 10 minutes, and the continuous recording time is approx. 2 hours and 20 minutes. The actual battery life may be shorter.

### To Remove the Battery Pack

(1) While sliding RELEASE on the battery adaptor, detach it from the camcorder.
(2) While sliding BATT. RELEASE on the battery adaptor, remove the battery pack from the adaptor.

### When the battery pack is discharged

Set the POWER switch on the camcorder to OFF, and replace the battery pack. If another battery pack is installed in the camcorder, replace both of them at the same time.

### Notes on the battery adaptor

- The camcorder is unstable if a battery adaptor is attached on it. Put the camcorder on its side or remove the battery adaptor.
- If you attach the battery pack while recording, recording stops and the camcorder switches to standby mode. Press START/STOP to continue recording. The transition between two scenes will b smooth.

## Using a Car Battery

Use the DC-V515 car battery charger (not supplied). Connect the car battery cord to the cigarette lighter socket of a car (12 V or 24 V). Connect the car battery charger and the camcorder using the supplied connecting cord.

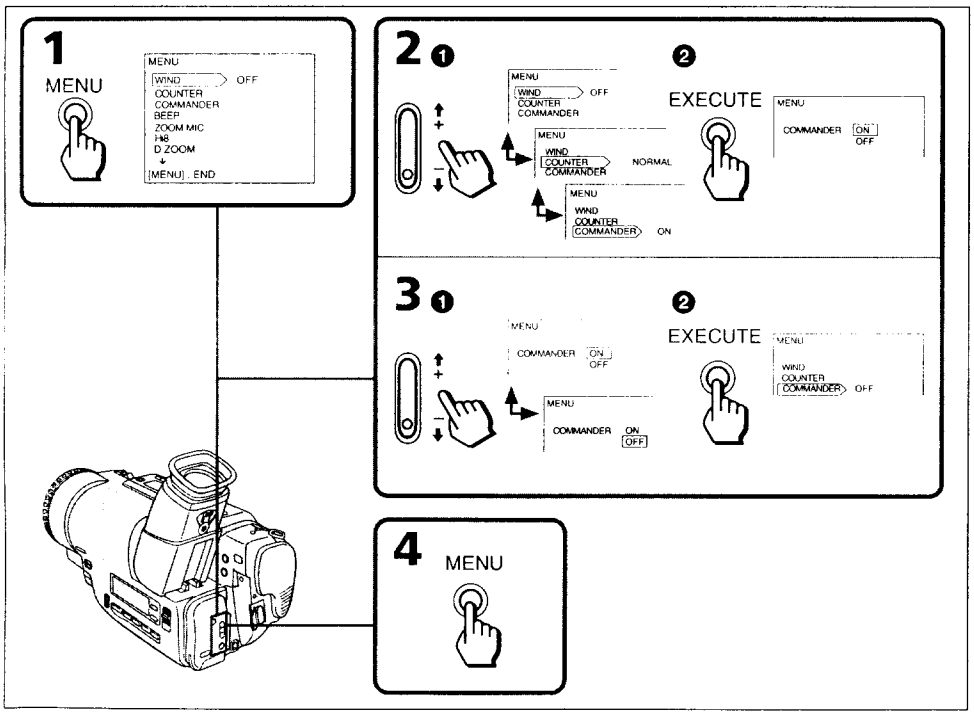
GENUINE VIDEO ACCY

This mark indicates that this product is a genuine product related to our 8 mm videc equipment.
We recommend that you purchase related 8 mm video products provided with the same mark or products provided with our logotype mark.

# Changing the Mode Settings

You can change the mode settings in the menu system to further enjoy the features and functions of the camcorder.

(1) Press MENU to display the menu in the viewfinder.
(2) Press ♦ (+) or ♦ (–) to select the desired item, then press EXECUTE.
(3) Press ♦ (+) or ♦ (–) to set the desired mode, then press EXECUTE. If you want to change the other modes, repeat steps 2 and 3.
(4) Press MENU to erase the menu display.






## Selecting the Mode Setting of Each Item

### Items for both CAMERA and VTR Modes

**COUNTER <NORMAL/TIME CODE>**

- Normally select NORMAL.
- Select TIME CODE to display the RC time code in order to edit more precisely.

**COMMANDER <ON/OFF>**

- Select ON when using the supplied Remote Commander for the camcorder.
- Select OFF when not using the Remote Commander.

**BEEP <ON/OFF>**

- Select ON so that beeps sound when you start/stop recording, etc.
- Select OFF when you do not want to hear the beep sound.

See the next page for further information.

## Changing the Mode Settings

**Hi8 <AUTO/OFF>**
- Normally select AUTO to have the camcorder automatically set the recording mode (Hi8 or standard 8 mm) depending upon the cassette type being used.
- Select OFF to record a Hi8 tape in standard 8 mm format.

**VF BRIGHT***
Select this item to adjust the brightness of the viewfinder. The viewfinder becomes brighter when you press ↑ (+), and darker when you press ↓ (–).

### Items for CAMERA Mode only

**WIND <ON/OFF>**
- Select ON to reduce wind noise when recording in strong wind.
- Normally select OFF.

**ZOOM MIC <ON/OFF>**
- Select ON when recording the sound "zoom" along with the picture.
- Select OFF when recording the usual Hi-Fi stereo sound regardless of zooming.

**D ZOOM* <ON/OFF>**
- Select ON to activate digital zooming.
- Select OFF to not use the digital zoom. The camcorder goes back to 16x zoom.

**REC LAMP* <ON/OFF>**
- Select OFF when you do not want the camera recording/battery lamp at the front of the unit to light up.
- Normally select ON.

**AE SHIFT***
Select this item to adjust the brightness of the picture.

**CLOCK SET***
Select this item to reset the date or time.

### Items for VTR Mode only

**EDIT <ON/OFF>**
- Select ON to minimize picture deterioration when editing.
- Normally select OFF.

**HiFi SND <STEREO/1/2>**
- Normally select STEREO.
- Select 1 or 2 to play back a dual sound track tape.

* These settings are retained even when the battery is removed, as long as the lithium battery is in place.

# Fade-in and Fade-out

You can fade in or out to give your recording a professional appearance.
When fading in, the picture gradually fades in from black or mosaic while the sound increases. When fading out, the picture gradually fades to black or mosaic while the sound decreases.

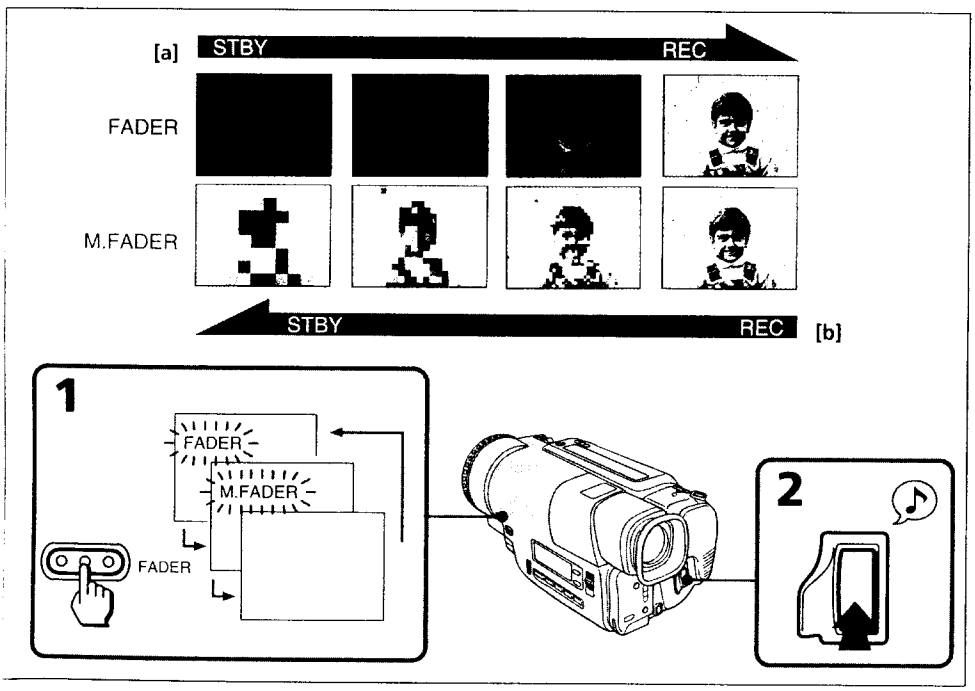
### When Fading in [a]

(1) While the camcorder is in Standby mode, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to start recording. The fade indicator stops flashing.

### When Fading out [b]

(1) During recording, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to stop recording. The fade indicator stops flashing, and then recording stops.






### To Cancel the Fade-in/Fade-out Function

Before pressing START/STOP, press FADER until the fade indicator disappears.

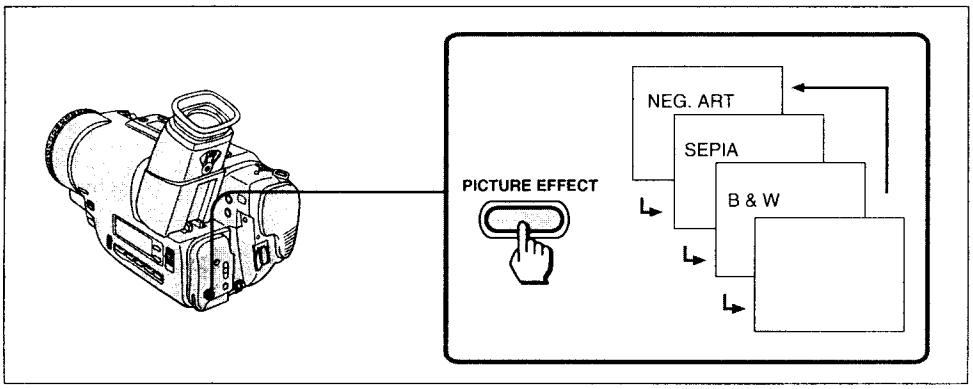
### When the date or time indicator is displayed

The date or time indicator does not fade in nor fade out.

# Enjoying Picture Effect

You can make pictures like those of television with the Picture Effect function.

Press PICTURE EFFECT to select the desired Picture Effect mode.




**NEG. ART**
The color of the picture is reversed.

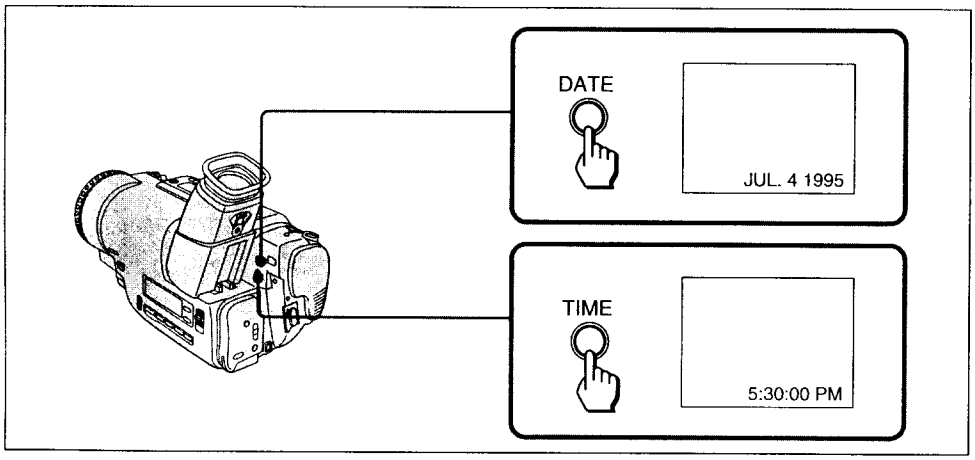
**SEPIA**
The picture is sepia.

**B&W**
The picture is monochrome (black and white).

**Note on the Picture Effect**
When you turn the power off, the camcorder returns automatically to normal mode.

# Recording with the Date or Time

Before you start recording or during recording, press DATE or TIME. You can record the date or time displayed in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date or time indicator, no indicator in the viewfinder is recorded.
The clock is already set to the East Coast Standard Time at the factory. You can reset the clock in the menu system (p. 54).



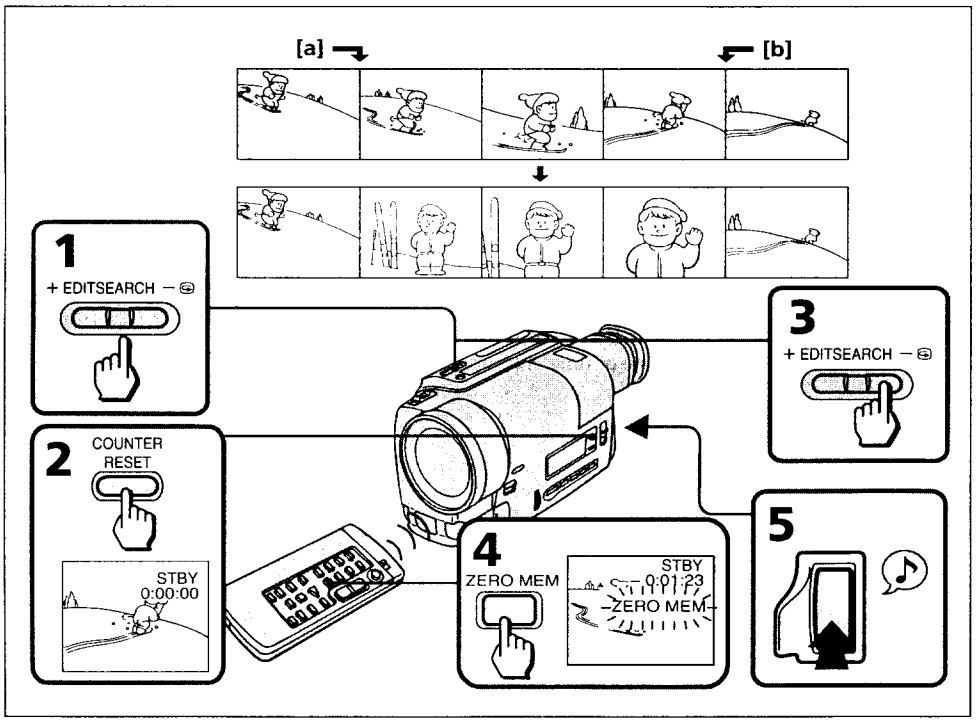

### To Stop Recording with the Date or Time

Press DATE or TIME again. The date or time indicator disappears. The recording continues.

# Re-recording a Picture in the Middle of a Recorded Tape

You can insert a scene in the middle of a recorded tape by setting the starting and ending points. The previous recorded portion will be erased. If the RC time code appears in the viewfinder, set COUNTER to NORMAL in the menu system (p. 23) to display the tape counter.

**(1)** While the camcorder is in standby mode, keep pressing the + (forward playback) or – (reverse playback) side of EDITSEARCH, and release the button where you want to end the insertion **[b]**. The camcorder enters standby mode again.
**(2)** Press COUNTER RESET. The counter resets to zero.
**(3)** Keep pressing the – side of EDITSEARCH and release the button at the point where you want to start the insertion **[a]**.
**(4)** Press ZERO MEM on the Remote Commander. The ZERO MEM indicator flashes.
**(5)** Press START/STOP to start recording. The recording stops automatically at the counter zero point.




### To Change the End Point

Press ZERO MEM to erase the ZERO MEM indicator, then repeat steps 2 to 5.

### Note on re-recording

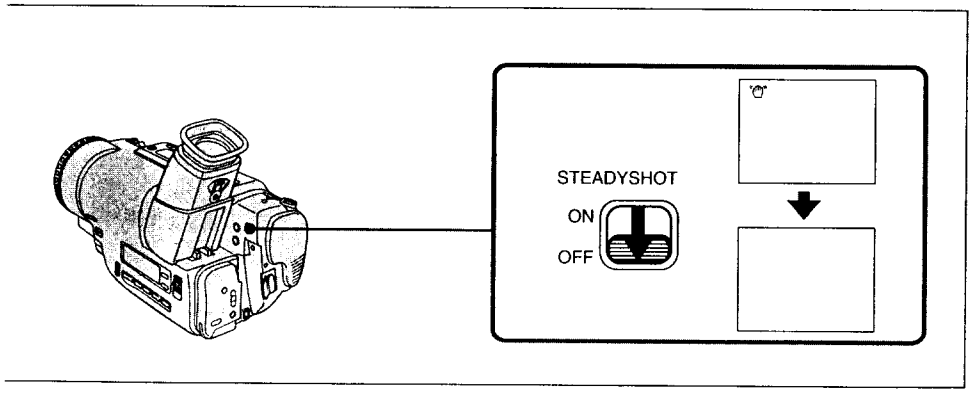
The picture and the sound may be distorted at the end of the inserted portion when it is played back.

# Releasing the STEADYSHOT Function

When you shoot, the indicator appears in the viewfinder. This indicates that the SteadyShot function is working and the camcorder compensates for camera-shake.

You can release the SteadyShot function when you do not need to use the SteadyShot function. Do not use the SteadyShot function when shooting a stationary object with a tripod.

Set STEADYSHOT to OFF.






### To Activate the SteadyShot Function Again

Set STEADYSHOT to ON.

### Note on the SteadyShot function

The SteadyShot function will not correct excessive camera-shake.

# Selecting Automatic/Manual Adjustment Modes

The camcorder's automatic functions offer you worry-free operation under most shooting conditions. But in some circumstances, manual adjustment is better for creative recording.
You can adjust focus, aperture, shutter speed, gain, and white balance automatically or manually. Also, you can use the PROGRAM AE function in particular circumstances, and adjust the brightness of the picture with the AE shift function.
Here's the overview of each manual adjustment. See the following pages for detailed information.

### To Focus Manually

Set FOCUS to MANUAL. You can adjust the focus regardless of the position of the AUTO LOCK switch. When you want to focus automatically, set FOCUS to AUTO.

### To Manually Adjust Aperture, Shutter Speed, Gain, and White Balance

Set AUTO LOCK to the center position. You can adjust each item independently. When you want to adjust each item automatically, set AUTO LOCK to AUTO LOCK.

### To Manually Adjust the Brightness

Use AE SHIFT in the menu system.

### Note on the previous settings

Once you adjust the settings manually, they are stored in memory in the following cases as long as the lithium battery is in place.

- when you return to automatic adjustment mode.
- when you set the POWER switch to OFF.
- in five minutes after you remove the power source.

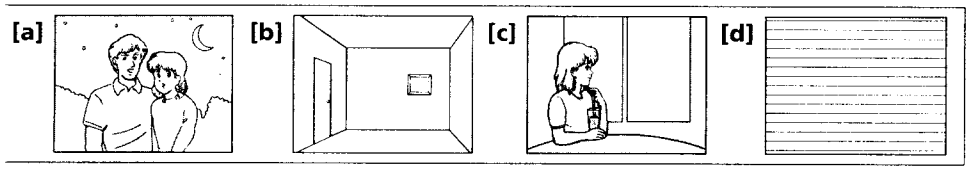
| | Automatic adjustment | PROGRAM AE | | | | Manual adjustment |
|---|---|---|---|---|---|---|
| | | Automatic (no indication) | Aperture priority mode | Shutter priority mode | Twilight mode | |
| Aperture | Automatic | Automatic | Manual | Automatically adjusted according to the shutter speed | Automatic | Automatic or Manual |
| Shutter speed | 1/60 | 1/60 | Automatically adjusted according to the aperture | Manual | 1/60 | 1/60 or manual |
| Gain | Automatic | Automatic | Automatic | Automatic | Automatic | Automatic or manual |
| White balance | Automatic | Changes each time you press the WHT BAL button<br>Automatic (no indication) → HOLD (hold) → ☀ (outdoor) → (indoor) | | | | |
| AE shift* | Effective | Effective | Effective | Effective | Effective | Effective |
| Focus | Automatic or Manual according to the position of the FOCUS switch | | | | | |

* You cannot change AE shift while adjusting the aperture manually.

# Focusing Manually

## When to Use Manual Focus

n the following cases you should obtain better results by adjusting the focus manually.

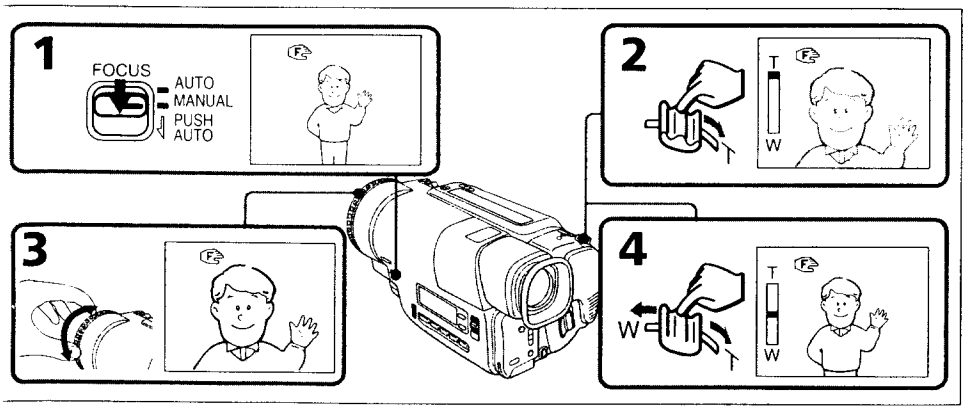



- Insufficient light **[a]**
- Subjects with little contrast — walls, sky, etc. **[b]**
- Too much brightness behind the subject **[c]**
- Horizontal stripes **[d]**
- Subjects through frosted glass
- Subjects beyond nets, etc.
- Bright subject or subject reflecting light
- Shooting a stationary subject when using a tripod

## Focusing Manually

When focusing manually, first focus in telephoto before recording, and then reset the shot length.

1) Set FOCUS to MANUAL. The MF indicator appears in the viewfinder.
2) Move the power zoom lever to the "T" side until the lever reaches the end.
3) Turn the focus ring to achieve a sharp focus. Be sure to not touch the built-in microphone when you turn the focus ring.
4) Set the desired shot length using the power zoom lever.






See the next page for further information.

## Focusing Manually

### To Return to Autofocus Mode

Set FOCUS to AUTO. The ☞ indicator in the viewfinder disappears.

### Shooting in relatively dark places

Shoot at wide-angle after focusing in the telephoto position.

### Note on the focus ring

The focus ring does not have a stop position.

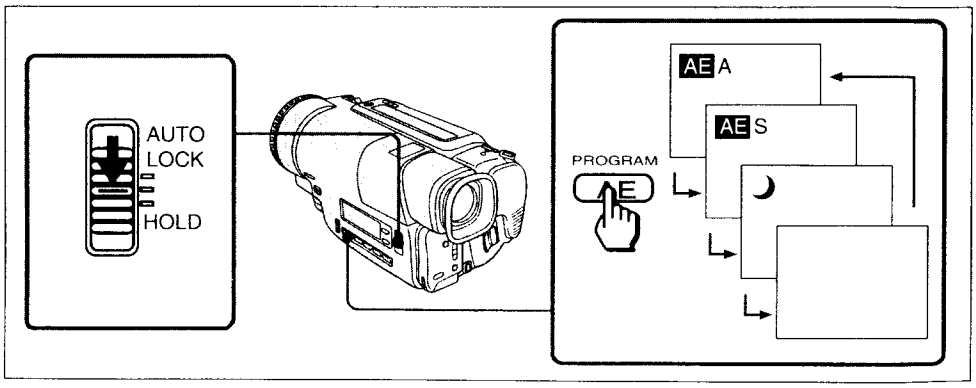
### To Shoot with Autofocus Momentarily

When you want to switch to autofocus momentarily while recording in manual focus mode, push FOCUS down to PUSH AUTO. Autofocus functions while FOCUS is held down. When it is released, manual focus mode will be resumed.

# Using the PROGRAM AE Function

## About the PROGRAM AE Function

You can select from three PROGRAM AE modes to fit the shooting situation. Set AUTO LOCK to the center position, then select the desired mode by pressing PROGRAM AE. Each time you press the button, the indicator in the viewfinder changes: AE A (Aperture Priority) → AE S (Shutter Priority) → ☽ (Twilight) → No indicator (Automatic), cyclically.




### Note on recording in PROGRAM AE

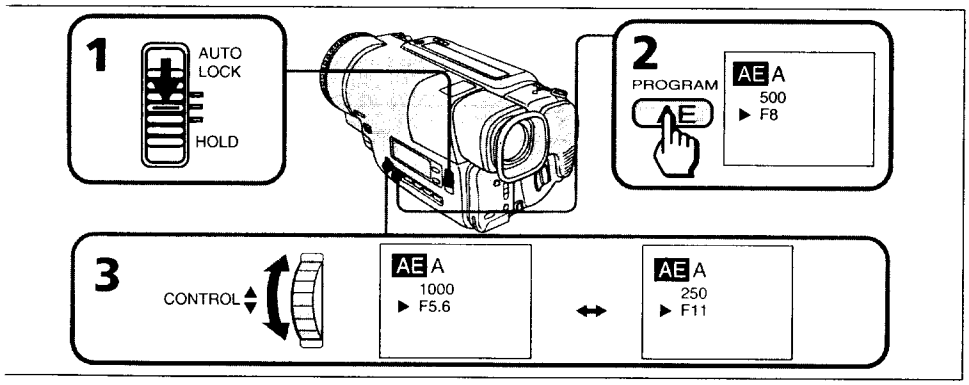
We recommend that you adjust the focus and white balance manually.

# Using the PROGRAM AE Function

## Using the Aperture Priority Mode

You can select the aperture to determine the desired depth of focus field. The shutter speed is automatically set (between 1/60 and 1/2000) according to the aperture value to maintain appropriate exposure.

(1) Set AUTO LOCK to the center position.
(2) Press PROGRAM AE so that AE A appears in the viewfinder.
(3) Turn CONTROL to select the desired aperture value. You can select from the following 15 values: F1.6, F2, F2.4, F2.8, F3.4, F4, F4.8, F5.6, F6.8, F8, F9.6, F11, F14, F16, F19. For a smaller aperture, select a higher value.




### To Return to Automatic Adjustment Mode

Set AUTO LOCK to AUTO LOCK, or press PROGRAM AE repeatedly so that no indicator appears in the viewfinder.

### About the depth of focus field

The depth of focus field is the in-focus range measured from the distance behind a subject to the distance in front. The depth of focus field can vary with the aperture value and the focal length. Lowering the F value (larger aperture) reduces the depth of focus field. Raising the F value (smaller aperture) provides a larger depth of focus field. Zooming in telephoto position offers a smaller depth of focus field while the depth of focus field in wide-angle position is greater.



See the next page for further information.

# Using the PROGRAM AE Function

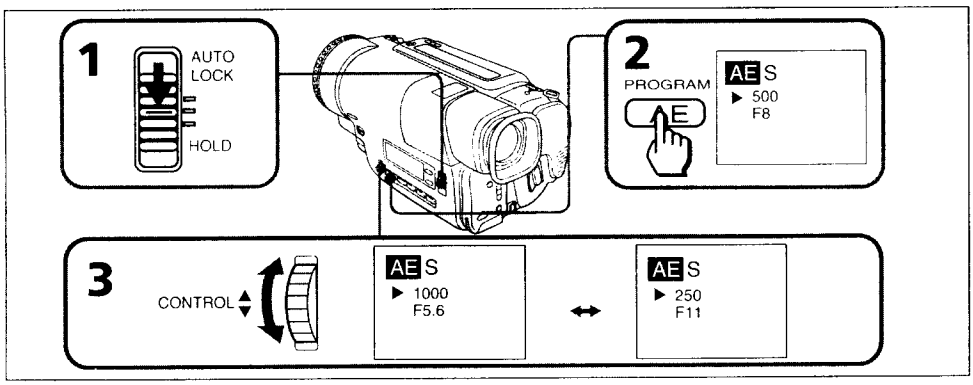
## Using the Shutter Priority Mode

You can select the shutter speed between 1/60 and 1/10000. When you select a faster shutter speed, movement appears clearer with less shaking. The aperture value is automatically adjusted according to the selected shutter speed to maintain appropriate exposure. This mode is most effective when you shoot the picture with high-speed movement.
Note that the shutter speed is indicated in the viewfinder as, for example, "100" for 1/100 shutter speed.

**(1)** Set AUTO LOCK to the center position.

**(2)** Press PROGRAM AE repeatedly so that AE S appears in the viewfinder.

**(3)** Turn CONTROL to select the desired shutter speed. You can select from the following 16 speeds: 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000. For a faster shutter speed, select a larger value indicator in the viewfinder.




### To Return to Automatic Adjustment Mode

Set AUTO LOCK to AUTO LOCK, or press PROGRAM AE repeatedly so that no indicator appears in the viewfinder.

#### When the aperture value is automatically adjusted to F1.6

We recommend shooting in sunlight or using a video light (not supplied).

#### When shooting a very bright subject

A vertical band (smear) may appear on the screen if the shutter speed is set too high.

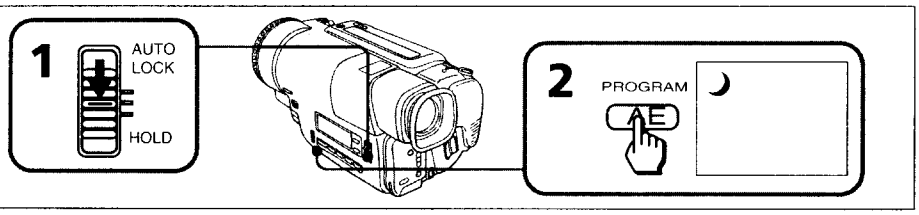
### To Select the Best Shutter Speed

| Subject | Shutter speed |
|---|---|
| • A golf swing or tennis match in fine weather (to view the hit ball clearly in still picture mode, set to 1/1000 to 1/4000) | 1/725 – 1/10000 |
| • A landscape shot from a moving car<br>• A moving roller coaster in overcast days<br>• An athletic scene, marathon, etc. | 1/125 – 1/500 |
| • Indoor sports<br>• Replacement for the ND2 filter (to halve the exposure)<br>• Recording pictures with less flicker under a fluorescent lamp | 1/100 |
| • In sunny weather (to avoid an out-of-focus picture due to a small aperture) | 1/90 |

## Using the Twilight Mode

'ou can record a bright subject in a dark place without ruining the atmosphere. The aperture is utomatically adjusted to maintain the appropriate exposure. The shutter speed is fixed at 1/60. This ıode is effective when you record night views, neon signs or fireworks.

1) Set AUTO LOCK to the center position.
2) Press PROGRAM AE repeatedly so that the ☽ indicator appears in the viewfinder.




### 'o Return to Automatic Adjustment Mode

et AUTO LOCK to AUTO LOCK, or press PROGRAM AE so that no indicator appears in the viewfinder.

### Vhen shooting an excessively bright subject

ıutofocus may not work effectively. Focus manually then.

# Using Manual Mode

'he manual mode features an advanced recording technique by controlling the exposure with a ombination of adjustments of the aperture value, shutter speed and gain level.

## When to Use Manual Mode

- When the background is too bright (backlighting) **[a]**, open the aperture (lower F value).
- When the subject is bright with dark background **[b]**, close the aperture (higher F value).
- When the subject moves at high speed **[c]**, set the shutter speed value faster.
- When a dark scene is shot overexposed **[d]**, lower the gain.

| Item | Selectable steps | Variation of exposure | Brighter ⟷ Darker |
|---|---|---|---|
| **Aperture** | 16 steps | 0.5 EV/step | F1.6 ⟷ F19 (CLOSE) |
| **Shutter speed** | 16 steps | 0.5 EV/step | 1/60 ⟷ 1/10000 |
| **Gain** | 8 steps | 0.5 EV/step | +18 dB ⟷ -3 dB |

### Jote on recording in manual mode

Ve recommend that you adjust the focus and white balance manually.

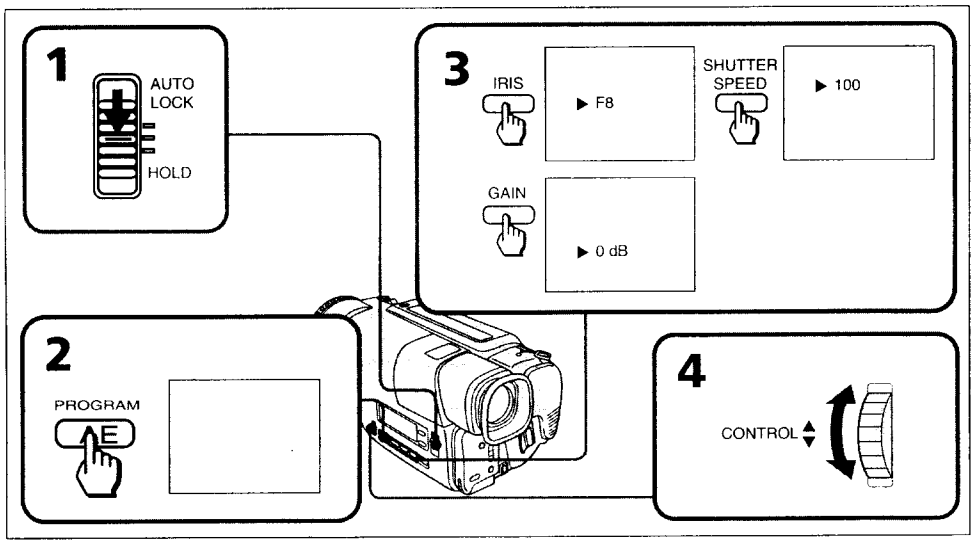
ee the next page for further information.

# Using Manual Mode

## Shooting in Manual Mode

In manual mode, you can adjust the aperture, shutter speed and gain independently. Use the graph on page 56 for your reference to set a value of each item.

(1) Set AUTO LOCK to the center position.
(2) If any of the PROGRAM AE indicators is displayed, press PROGRAM AE repeatedly so that no indicator appears in the viewfinder.
(3) Press the button of the item you want to adjust (IRIS, SHUTTER SPEED, or GAIN). The ▶ indicator and the automatically adjusted value appear in the viewfinder, and the ▲▼ indicator appears in the display window.
(4) Turn CONTROL to adjust the selected item.




### Adjustment of Each Item

**To adjust the aperture**

You can select the aperture from the following 16 values: F1.6, F2, F2.4, F2.8, F3.4, F4, F4.8, F5.6, F6.8, F8, F9.6, F11, F14, F16, F19, CLOSE. To open the aperture (larger aperture), select a lower value.

**To adjust the shutter speed**

You can select the shutter speed from the following 16 speeds: 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000. To increase the shutter speed, select a smaller setting (larger value indicator in the viewfinder).

**To adjust the gain**

You can select the gain from the following 8 levels: –3 dB, 0 dB, +3 dB, +6 dB, +9 dB, +12 dB, +15 dB, +18 dB. To increase the gain to brighten the picture, select a higher level.
If you adjusted the aperture manually prior to adjusting the gain, the gain level is set according to the aperture setting.

### To Change the Setting

Press the button of the item you want to change so that the ▶ indicator appears in the viewfinder at the side of the selected item. Turn CONTROL to change to the desired setting.

### To Lock the Manual Settings

After adjusting the setting, set AUTO LOCK to HOLD. The IRIS, SHUTTER SPEED, GAIN, WHT BAL buttons and the CONTROL dial do not work.

### To Return to Automatic Adjustment Mode

Press the button of the item you want to return to automatic adjustment mode so that the ▶ indicator appears in the viewfinder at the side of the selected item, then press the same button again. To return all the items to automatic mode, set AUTO LOCK to AUTO LOCK.

### Note on gain level

When you select a gain level that is too high, the picture may be distorted.

# Tips for Manual Adjustment

When you shoot in manual adjustment mode, we recommend you to keep the exposure fixed to make a clear picture. This section shows you what the exposure is and how to adjust each item with the exposure fixed.

## Understanding the Exposure

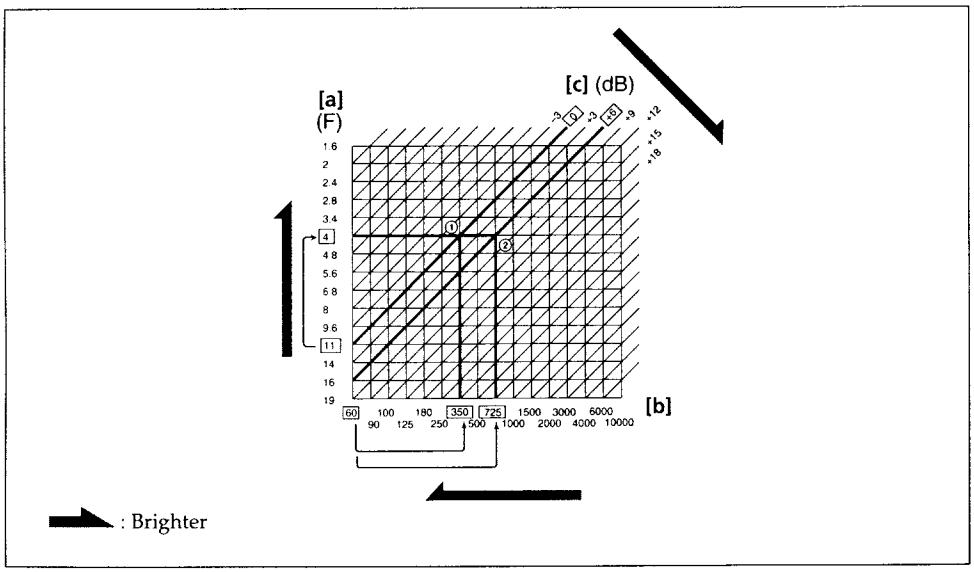
Exposure is determined by aperture, shutter speed and gain, and is measured in EV (exposure value) as shown below.

**Total EV = EV from aperture control**
**+ EV from shutter speed control**
**+ EV from gain control**

The total exposure value can be varied or maintained at a constant level by controlling the aperture, gain and shutter speed.

Use the following graph to select the setting. One scale corresponds to one step of each item. The exposure changes 0.5 EV per step.

**[a]** Vertical axis: Aperture value (F value)
**[b]** Horizontal axis: Shutter speed (per second)
**[c]** Diagonal axis: Gain level (dB)



## Creating a Desired Picture without Changing the Exposure

**When the aperture value is F11, the shutter speed is 1/60, and the gain level is 0 dB, adjust the aperture value manually to F4, as an example.**

When you change the aperture, shutter speed or gain level by 1 step, the exposure changes by 0.5 EV. If you change the aperture value from F11 to F4 in the above example, the exposure from aperture control becomes brighter by 6 steps (+3 EV). Adjust the shutter speed and the gain so that the exposure becomes darker by –3 EV to not change the total exposure.

### Example 1: Changing Only the Shutter Speed

To reduce the exposure by –3 EV using the shutter speed, you should increase the speed 6 steps. Change the shutter speed from 1/60 to 1/350 (①).

### Example 2: Setting the Shutter Speed to 1/725 and Changing the Gain Level

When the shutter speed is changed from 1/60 to 1/725, the EV from the shutter speed control changes to –4 EV. To maintain total exposure, +1 EV (2 steps) should be added by increasing the gain level. Change the gain level from 0 dB to +6 dB (②). Note that when you set the gain level higher, the picture may be distorted.

### Notes on manual adjustment

- When recording outdoors, the brightness of a subject may be affected by weather.
- When recording conditions change, we recommend that you reset each item.

# Adjusting the Brightness of the Picture

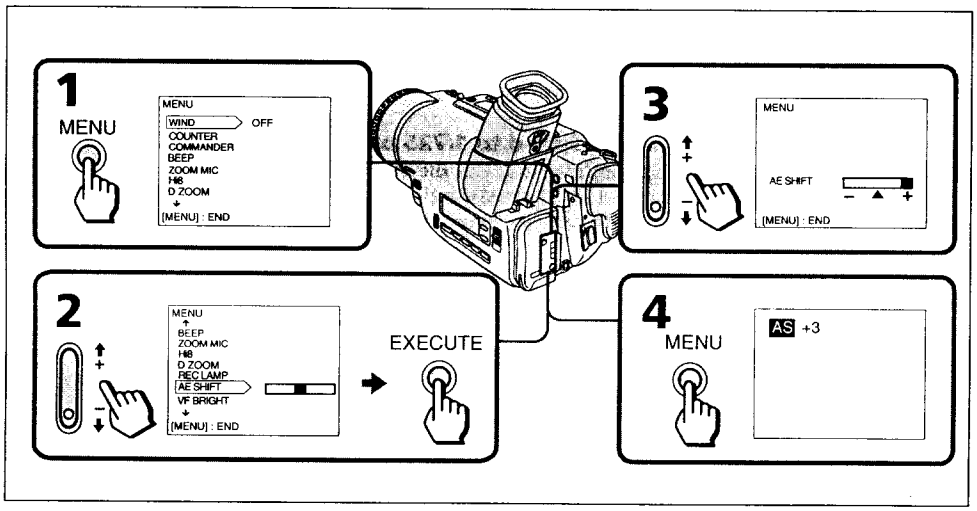
When you shoot in a snowfield or on a beach in the mid-summer and the subject may become dark because of the extreme brightness, you can change the brightness of the picture in the menu system. You can also use this function when the subject is too bright — subjects on stages, night views, etc.

**(1)** While the camcorder is in Standby mode, press MENU to display the menu in the viewfinder.

**(2)** Press ↑ (+) or ↓ (–) to select AE SHIFT, then press EXECUTE.

**(3)** Press ↑ (+) or ↓ (–) to adjust the brightness of the picture. The picture becomes brighter when you press ↑ (+), and darker when you press ↓ (–).

**(4)** Press MENU. The menu display disappears and the AE shift indicator appears in the viewfinder.




### To Cancel the AE shift

Set AE SHIFT to the center position in the menu system.

### When adjusting the brightness

We recommend you to connect the camcorder to a TV so that you can monitor the brightness on the TV.

### Note on the AE shift

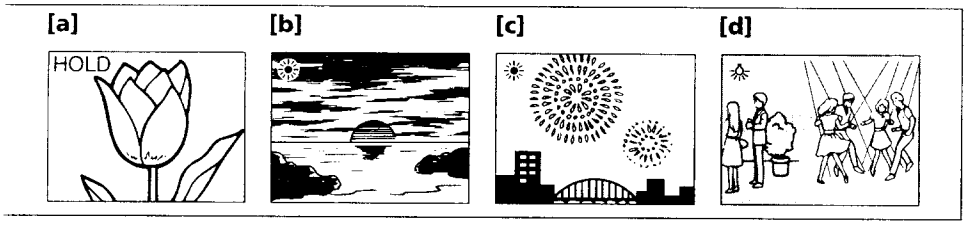
You cannot change AE shift while adjusting the aperture manually.

# Adjusting the White Balance

White balance is the adjustment to make white subjects look white and to obtain a more natural color balance.

## Selecting the Appropriate Mode

Select the appropriate white balance mode under the following conditions:




**HOLD Hold mode**

- Shooting with the lighting condition on the subject set and with the white balance fixed
- Monochromatic subject or background **[a]**

**Outdoor mode**

- Under a color matching fluorescent lamp
- Recording a sunset/sunrise, just after sunset, just before sunrise **[b]**, neon signs, or fireworks **[c]**

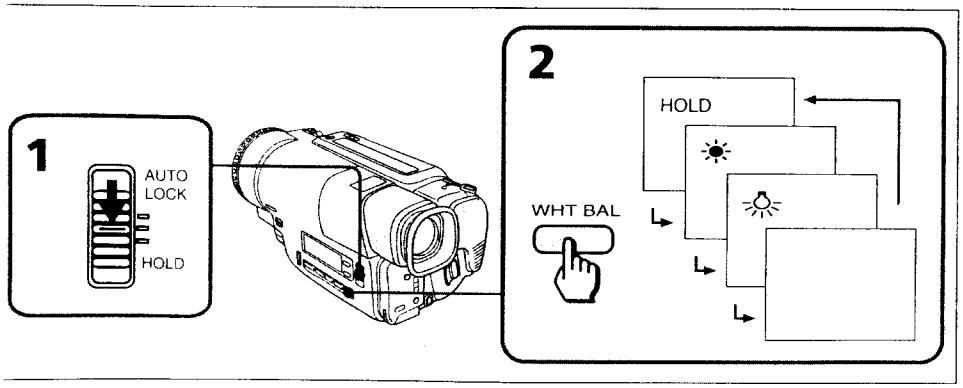
**Indoor mode**

- Lighting condition changes quickly **[d]**
- Too bright place such as photography studios
- Under sodium lamps or mercury lamps

When you shoot under a fluorescent lamp, however, we recommend you to adjust the white balance automatically. You may not get an appropriate white balance when you record in the indoor mode.

## Setting the White Balance Mode

1) Set AUTO LOCK to the center position.
2) Press WHT BAL repeatedly so that the desired mode indicator appears in the viewfinder.




See the next page for further information.

## Adjusting the White Balance

### To Return to Automatic White Balance Mode

Press WHT BAL repeatedly until the white balance indicator disappears, or set AUTO LOCK to AUTO LOCK.

#### When the light source changes

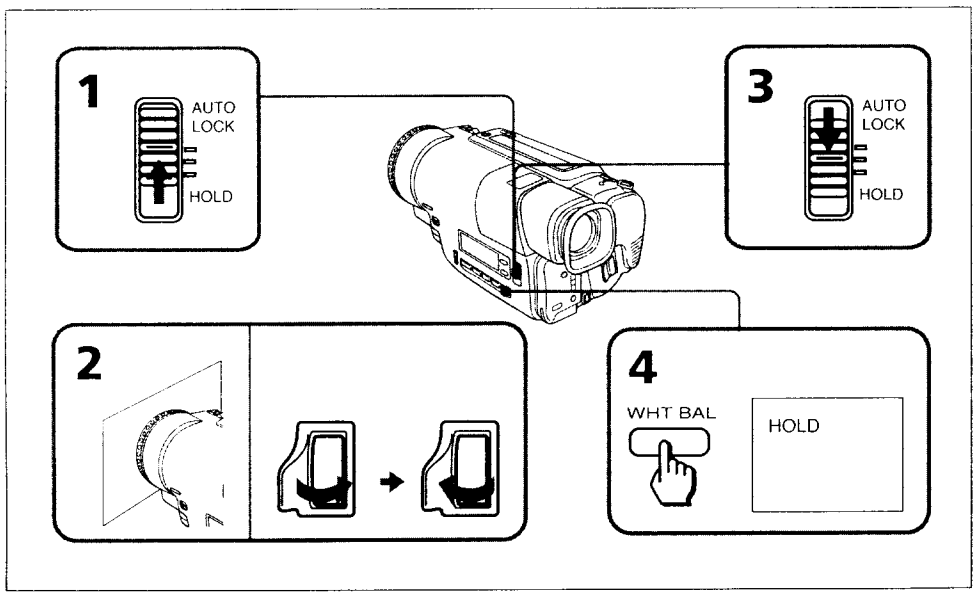
Adjust the white balance again.

- When you record in manual adjustment mode, set AUTO LOCK to AUTO LOCK once, then set it to the center position again.
- When you record in automatic adjustment mode, or when you replace the battery pack, point the lens toward a white object for approx. 10 seconds, then start recording.

### Locking the White Balance Setting (HOLD mode)

When you set the white balance to HOLD mode, the last automatic white balance setting will be locked and maintained even if lighting conditions change.

(1) Set AUTO LOCK to AUTO LOCK.
(2) Point the camcorder at a white and flat object such as a white wall or paper for about 15 seconds. Or, close the STANDBY cover while recording a white object, then open the cover again.
(3) Set AUTO LOCK to the center position.
(4) Press WHT BAL so that the HOLD indicator appears in the viewfinder.



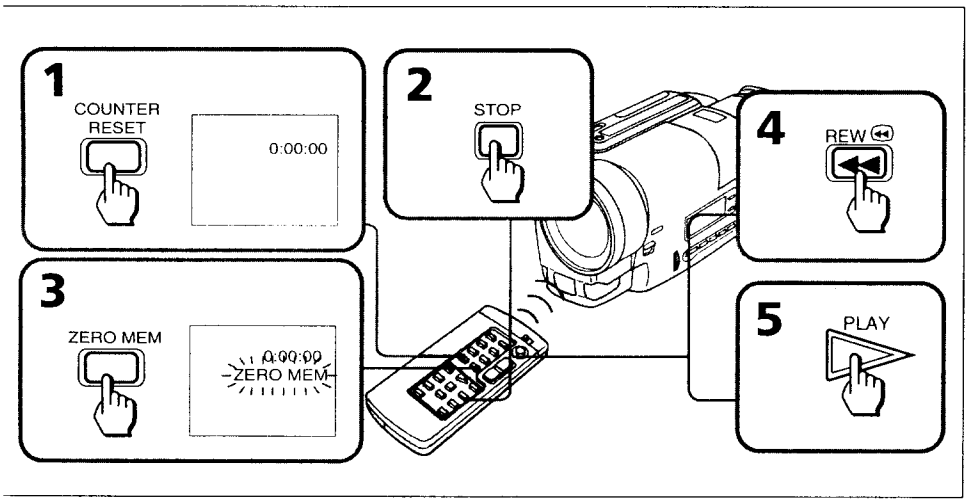

#### Note on the HOLD mode setting

The white balance setting for HOLD mode is retained even when you remove the battery pack or change white balance mode, as long as the lithium battery is installed in the camcorder.

# Returning to a Pre-registered Position

Using the Remote Commander, you can easily go back to the desired point on a tape after playback. Use the tape counter. If the RC time code appears in the viewfinder, set COUNTER to NORMAL in the menu system (p. 23) to display the tape counter.

(1) During playback, press COUNTER RESET at the point you later want to locate. The counter shows "0:00:00" in the viewfinder.
(2) Press ■ when you want to stop playback.
(3) Press ZERO MEM on the Remote Commander. The ZERO MEM indicator flashes in the viewfinder.
(4) Press ◄◄ to rewind the tape to the counter's zero point. The tape stops automatically when the counter reaches approximately zero.
(5) Press ►. Playback starts from the counter's zero point.




### Notes on the tape counter

- Something must be recorded on the tape in order for the tape counter to function. Tape counter does not work on a blank tape.
- There may be a discrepancy of several seconds from the actual time.

### Notes on ZERO MEM

- When you press ZERO MEM, the counter's zero point is memorized. Press ZERO MEM again before rewinding to cancel the memory.
- This function is cancelled automatically once the tape is rewound or advanced to the point you pre-registered.
- ZERO MEM does not function during recording or playing back.

### Using this Function in Reverse

You can return to a desired position after rewinding with this function. Press COUNTER RESET at the point you want to return to later. Press ◄◄. Press ■ when you want to stop rewinding. Press ZERO MEM on the Remote Commander. Press ►►. The tape automatically stops when the counter reaches approximately zero.

# Locating the Marking Position

You can locate the beginning of a desired program easily by marking an index signal during recording or playback and searching for it later.

## Marking an Index Signal

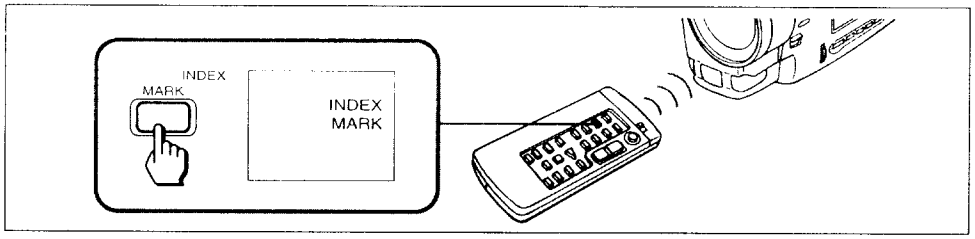
You can mark an index signal during recording or playback. You can also mark it with the Remote Commander.

### When Marking at the Beginning of Recording or Playback

Press INDEX MARK on the Remote Commander or the camcorder in recording standby or playback pause mode. The INDEX MARK indicator appears in the viewfinder with the MARK indicator flashing. When recording or playback starts, the MARK indicator stops flashing. This shows that the index signal is being marked. Then the INDEX MARK indicator will disappear.

### When Marking during Recording or Playback

Press INDEX MARK on the Remote Commander or the camcorder at the point you want to locate later.

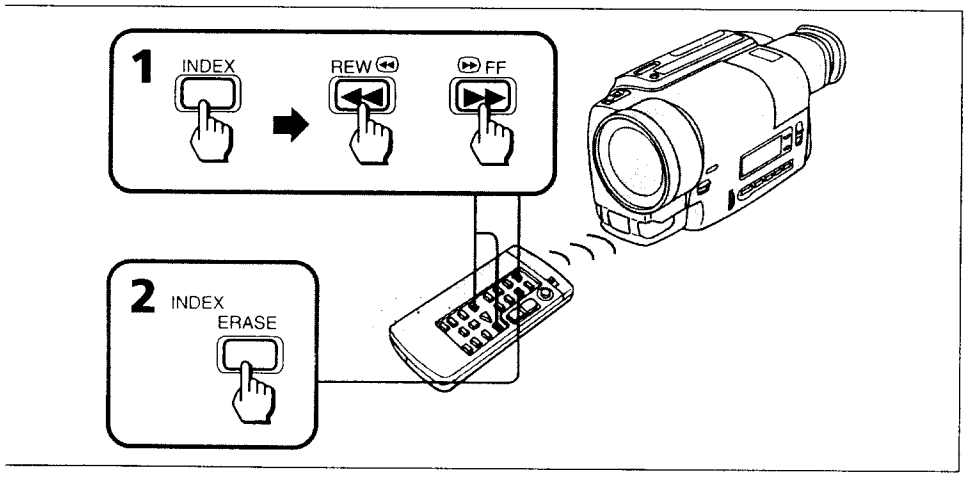



**Notes on marking**

- Make sure you mark index signals at more than two-minute intervals. Otherwise, you may not be able to search for them correctly.
- If you stop recording while the index signal is being marked (the INDEX MARK indicator lights in the viewfinder), the search may not be completed correctly.
- If you mark an index signal on the tape with the Data Code or RC time code recorded, the Data Code or RC time code will be erased at the point on which the index signal is marked. When playing back this tape, the camcorder keeps displaying the Data Code immediately before the erased one. If the Data Code does not exist for more than 30 seconds, the Data Code displays bars (--).
- A black band appears when you mark index signal during playback, and the sound is not recorded. This does not affect the picture and the sound that are already recorded.
- An index signal is marked automatically when you start recording with the POWER switch to VTR. When you start recording from recording pause mode, however, an index signal is not marked.
- You cannot mark an index signal on a tape with the red mark on the cassette exposed (p. 8), or on a tape recorded in LP mode.

## Erasing an Index Signal

1) Locate the index signal to be erased using the index scan or index search function (p. 46, 47).
2) Press INDEX ERASE on the Remote Commander within 2 to 10 seconds while the desired program plays back. After the index signal is erased, the camcorder returns to index scan or index search mode, whichever was used in step 1.






### lotes on erasing

Press INDEX ERASE more than 2 seconds after the playback of the desired program begins.
You cannot erase the index signal on a tape with the red mark on the cassette exposed.
While the index signal is being erased, the sound cannot be heard and a black band appears at the bottom of the picture. This will not affect the recorded sound or picture.
The camcorder can detect index signals marked with VCRs, but cannot erase them. VCRs with an index function can detect index signals marked with this camcorder but cannot erase them.
An index signal may be erased when making PCM after recording on another VCR in the portion where the index signal is marked.

### lote on RC time code and Data Code

Vhen an index signal is erased, the RC time code and Data Code on the same portion of the tape is also rased. Bars (--) appear in place of the RC time code when the portion is played back. To use that tape or editing using an editing controller (not supplied), rewrite the RC time code (p. 48).

ee the next page for further information.

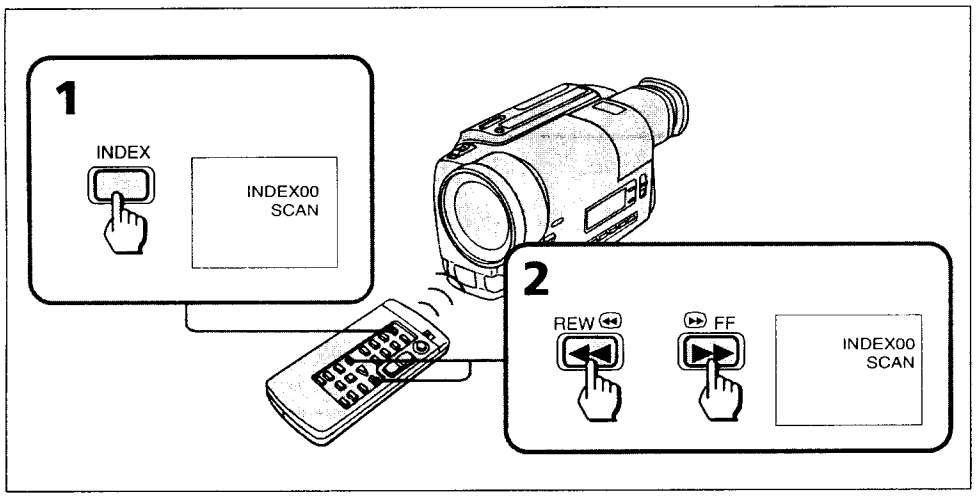
## Locating the Marking Position

### Scanning the Beginning of Each Marking Position — Index Scan

Use the Remote Commander. To view the picture on a TV, press DISPLAY.

(1) Press INDEX on the Remote Commander during normal playback.

(2) Press ◄◄ or ►►. The tape rewinds or advances rapidly and plays back for approximately 10 seconds from the point on which the index signal was marked. If you want to continue playback, press ►. When you do not press any button, the tape is automatically scanned to the next program.



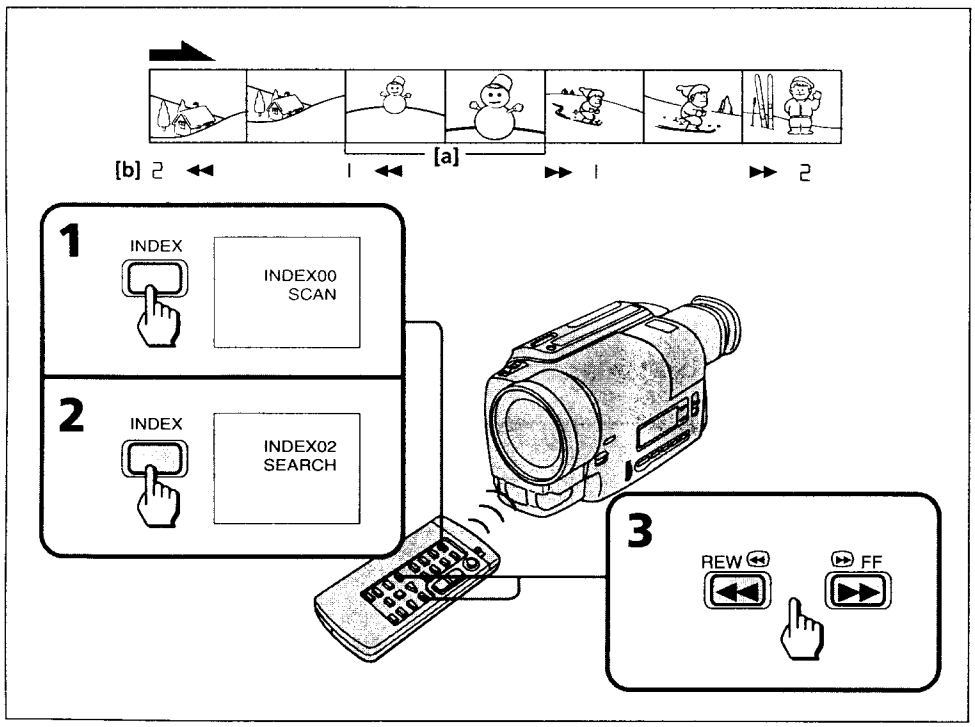

**To Cancel Index Scan Mode**

Press ►. Normal playback resumes.

## Locating the Desired Marking Position — Index Search

**(1)** Press INDEX on the Remote Commander during stop or playback mode.
**(2)** Press INDEX repeatedly until the index number of the desired program is displayed in the viewfinder.
**(3)** Press ◀◀ or ▶▶. Playback starts from the beginning of the desired program.

**[a]** the current position
**[b]** the index number




### To Stop Index Search Mode

Press ■. Normal playback resumes.

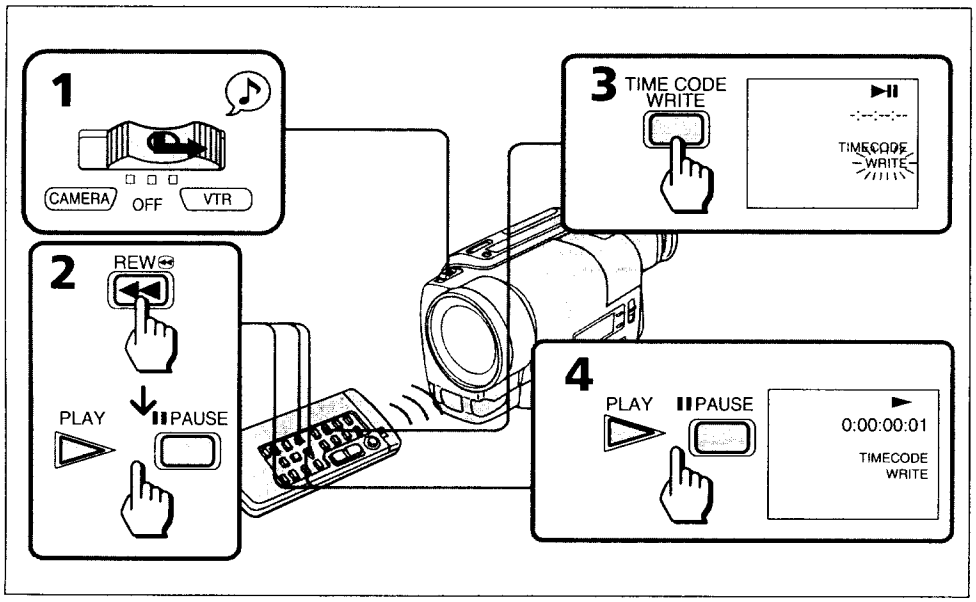
### Note on the index number

The index number (1, 2, etc.) indicates the distance from the point you are now viewing **[a]**, regardless of the direction.

# Writing the RC Time Code on a Recorded Tape

You can write the RC time code on a recorded tape. Use the Remote Commander.

(1) While pressing the small green button on the POWER switch, slide it to VTR.
(2) Rewind the tape to the beginning and set the camcorder to playback pause mode.
(3) Press TIME CODE WRITE on the Remote Commander. The TIME CODE WRITE indicator appears in the viewfinder with the WRITE indicator flashing.
(4) Press ► or II to start playback. The WRITE indicator stops flashing and the RC time code writing starts from 0:00:00:00.




### To Stop Writing the RC Time Code

Press ■ (or any tape transport button).

### To Write the RC Time Code from the End of the RC Time Code Recorded Portion

Rewind the tape to the portion on which the RC time code has been written and set the camcorder to playback pause mode. Then follow steps 3 and 4 above. The RC time code is written continuously.

### Notes on writing the RC time code

- The RC time code writing stops when:
  - you press TIME CODE WRITE again before starting playback.
  - you press INDEX before starting playback.
  - you change from playback mode to another mode.
- When you are writing the RC time code from the middle of a tape without the time code written, writing starts several frames before the current picture.
- If you write the RC time code on a recorded tape, the Data Code is erased.
- You cannot mark the RC time code on the tape that is recorded in LP mode. Though you can mark the RC time code on a tape recorded both in LP mode and SP mode, the RC time code written in LP mode, however, may not be read correctly.

**Note on --:--:--:-- indicator**

The --:--:--:-- indicator appears during playback if:

- nothing is recorded.
- the RC time code is unreadable because of the damage of the tape or because of the noise.
- you recorded using another VCR without RC time code function.
- you erase the index signal or make PCM after recording on another VCR in the portion on which the RC time code is written.

In this case, we recommend you to rewrite the RC time code.

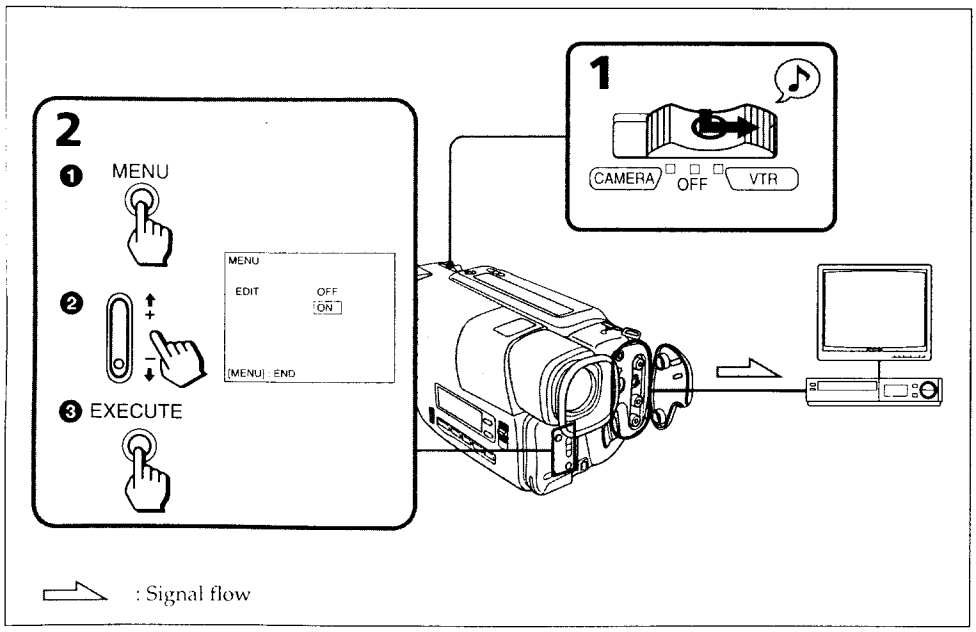
# Editing onto Another Tape



You can create your own video program by editing with any other 8 8 mm, Hi8 Hi8, VHS VHS, S-VHS S-VHS, VHSC VHSC, S-VHSC S-VHSC, Betamax or ED Beta ED Betamax VCR that has video/audio inputs.

## Before Editing

Connect the camcorder to the VCR using the supplied A/V connecting cable (p. 14). You can also connect to the VCR using the Handycam Station (supplied for Canadian model only) (p. 15).
Set the input selector on the VCR to LINE, if available.
**(1)** While pressing the small green button on the POWER switch, slide it to VTR.
**(2)** Set EDIT to ON in the menu system (p. 24).




See the next page for further information.

# Editing onto Another Tape

## Starting Editing

(1) Insert a blank tape (or a tape you want to record over) into the VCR, and insert your recorded tape into the camcorder.
(2) Play back the recorded tape on the camcorder until you locate the point where you want to start editing, then press ❚❚ to set the camcorder in playback pause mode.
(3) On the VCR, locate the recording start point and set the VCR in recording pause mode.
(4) Press ❚❚ on the camcorder and VCR simultaneously to start editing.

### To Edit More Scenes

Repeat steps 2 to 4.

### To Stop Editing

Press □ on both the camcorder and the VCR.

#### Use of the EDITSEARCH button

You can play back the tape in normal/reverse direction by holding down EDITSEARCH during playback pause mode. You can also play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

#### Note on the DISPLAY function

If you have displayed the viewfinder screen indicators on the TV, erase the indicators by pressing DISPLAY on the Remote Commander so that they will not be superimposed on the edited tape.

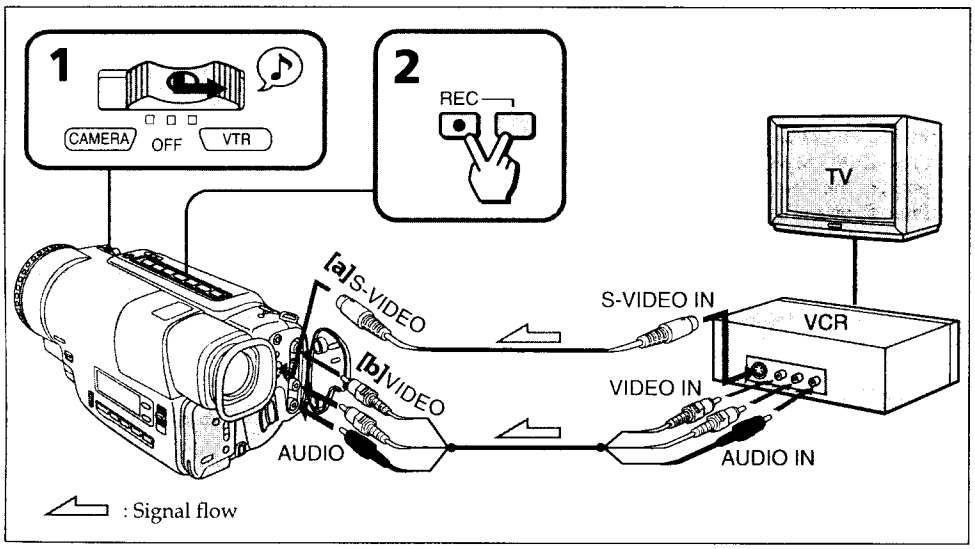
# Recording from a VCR or TV

You can record a tape from another VCR or a TV program from a TV that has video/audio outputs. Connect the camcorder to the VCR or TV.

**(1)** While pressing the small green button on the POWER switch, slide it to VTR.

**(2)** Press REC ● and the button on the right together at the point where you want to start recording.

In recording and recording pause mode, S VIDEO and VIDEO/AUDIO jacks automatically work as input jacks.




If your TV or VCR is a monaural type, connect only the white plug for audio on both the camcorder and the TV or VCR.

If you are going to connect the camcorder using the S video cable **[a]**, you do not need to connect the yellow (video) plug of the A/V connecting cable **[b]**.

### To Check the Picture from a VCR or TV before Recording

Press ❚❚ after pressing ●. You can check the picture in the viewfinder.

### To stop Recording

Press □.

See the next page for further information.

## Recording from a VCR or TV

### Replacing Recording on a Tape (Insert Editing)

You can insert a new scene from a VCR onto your originally recorded tape by specifying starting and ending points.
Connections are the same as in "Recording from a VCR or TV" on the previous page.

**(1)** While pressing the small green button on the POWER switch, slide it to VTR.
**(2)** On the VCR, locate the start point to be inserted and set it to playback pause mode.
**(3)** On the camcorder, locate the point where the insert should end by pressing ◀◀ or ▶▶, then press ❚❚ to set it to playback pause mode.
**(4)** Press COUNTER RESET to set the counter to zero.
**(5)** On the camcorder, locate the point where the insert should begin by pressing ◀◀, then press ● REC and ❚❚ to set it to recording pause mode.
**(6)** Press ZERO MEM on the Remote Commander. The ZERO MEM indicator flashes and the end point of the insert is stored in memory.
**(7)** Press ❚❚ on the camcorder and the VCR simultaneously to start insert editing.

The insert editing stops automatically near the counter's zero point.

#### To Change the End Point

Press ZERO MEM on the Remote Commander so that the ZERO MEM indicator disappears and begin from step 3.

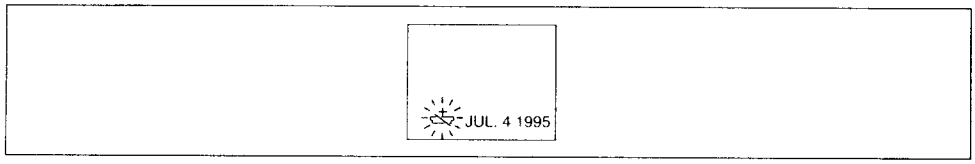
#### Note on the inserted picture

The picture may be distorted at the end of the inserted portion when it is played back.

Additional Information

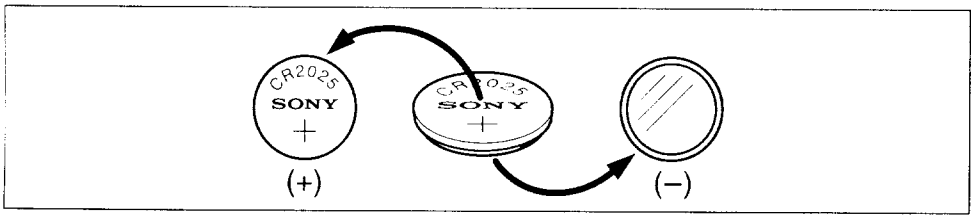
# Changing the Lithium Battery in the Camcorder

Your camcorder is supplied with a lithium battery installed. The lithium battery for the camcorder lasts for about 1 year under normal operation. When the battery becomes weak or dead, the ⚠ indicator flashes in the viewfinder for about 5 seconds when you set the POWER switch to CAMERA. In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of any other battery may present a risk of fire or explosion.**




### Note on Lithium Battery

The lithium battery has a positive (+) side and a negative (–) side as illustrated. **Be sure to insert the lithium battery with the positive side facing out.**




**WARNING**

The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

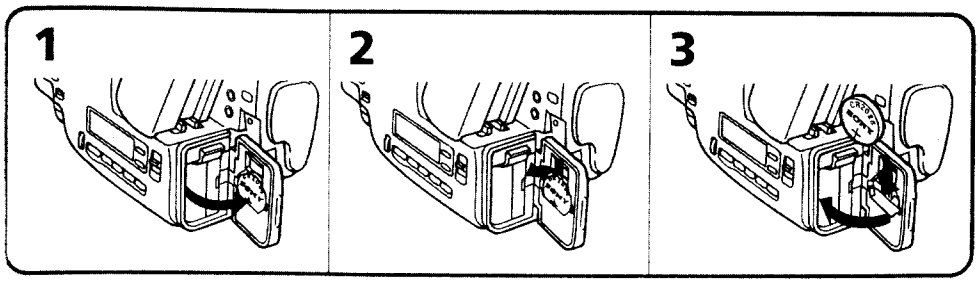
**Caution**

**Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.**

## Changing the Lithium Battery

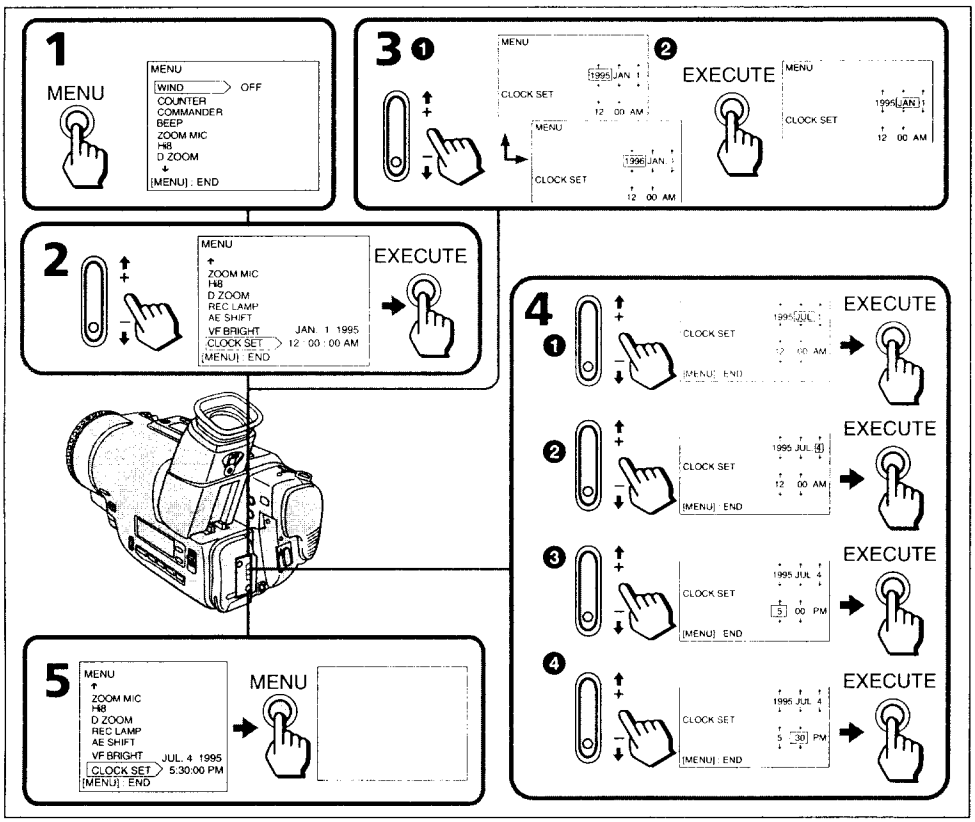
When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date, time and other items in the menu system retained by the lithium battery.

**(1)** Open the lid of lithium battery compartment.
**(2)** Push the battery down once and pull it out from the holder.
**(3)** Install the lithium battery with the positive (+) side facing out. Close the lid.



# Resetting the Date or Time

You can reset the date or time in the menu system.
**(1)** Press MENU to display the menu in the viewfinder.
**(2)** Select CLOCK SET, then press EXECUTE.
**(3)** Press ▲ (+) or ▼ (–) to adjust the year, and then press EXECUTE.
**(4)** Set the month, day, hour and minutes by pressing ▲ (+) or ▼ (–) and pressing EXECUTE.
**(5)** Press MENU to erase the menu display.




### To Correct the Date and Time Setting

Repeat steps 2 to 4.

### To Check the Preset Date and Time

Press DATE to display the date indicator in the viewfinder.
Press TIME to display the time indicator.
When you press the same button again, the indicator goes off.

**The year indicator changes as follows:**

1995 ⟷ 1996 ⟷ 2024

### Note on the time indicator

The internal clock of this camcorder operates on a 12-hour cycle.
12:00 AM stands for midnight.
12:00 PM stands for noon.

# Playback Modes

## Selecting Cassette Types

This Hi8 system is an extension of the standard 8 mm system, and was developed for higher-quality pictures.
You can use Hi8 video and standard 8 mm cassettes. When you want to record in the Hi8 system, use only Hi8 video cassettes. You cannot record on standard 8 mm cassettes in the Hi8 system.
If you are going to play back the tape using a standard 8 mm video recorder/player, you should record the tape in the standard 8 mm system.
If you want to use a Hi8 cassette with the standard 8 mm video recorder system, set Hi8 to OFF in the menu system before recording (p. 24).

| To play back in | Hi8 | Standard 8 | |
|---|---|---|---|
| Record using cassette type | Hi8 | Hi8 | 8 |
| Set Hi8 setting to | AUTO | OFF | AUTO (or OFF) |

## When You Play Back

The playback mode (SP/LP or Hi8/standard 8 mm) is selected automatically according to the format in which the tape has been recorded. The quality of the recorded picture in LP mode, however, will not be as good as that in SP mode.

### Note on AFM HiFi stereo

When you play back a tape, the sound will be in monaural if:

- You record the tape using this camcorder, then play it back on an AFM HiFi monaural video recorder/player.
- You record the tape on an AFM HiFi monaural video recorder, then play it back on this camcorder.

### LP (long play) mode

When you play back a tape recorded in LP mode, the LP indicator lights up in the viewfinder. This camcorder cannot record a tape in LP mode.

### Foreign 8 mm video

You cannot play back software recorded on a different TV color system. Because the TV color systems differ from country to country, you may not be able to play back foreign pre-recorded software. Refer to page 61 to check the TV color system of foreign countries.

# Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

## Preparing the Battery Pack

### Always Carry Additional Batteries

Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

### Battery Life is Shorter in a Cold Environment

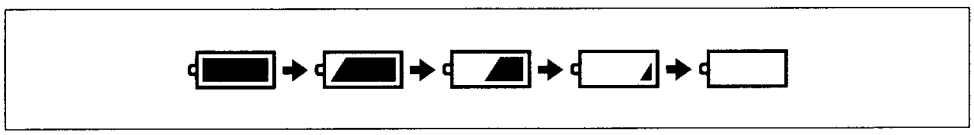
Battery efficiency is decreased and the battery will be used up more quickly if you are recording in a cold environment.

### To Save Battery Power

Close the STANDBY cover when not recording to save battery power **[a]**.
A smooth transition between scenes can be made even if recording is stopped and started again. While you are positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

## When to Replace the Battery Pack

While you are using your camcorder, the remaining battery indicator in the viewfinder decreases gradually as battery power is used up.



When the remaining battery indicator reaches the lowest point, the ⌧ indicator appears and starts flashing in the viewfinder **[b]**.
When the ⌧ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, slide the POWER switch to OFF on the camcorder and replace the battery pack. Leave the tape in the camcorder to obtain a smooth transition between scenes after the battery pack is replaced.

## Notes on the Rechargeable Battery Pack

### Caution

Never leave the battery pack under temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight.

### The Battery Pack Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

### Battery Pack Care

- **Remove the battery pack from the camcorder after using the battery pack,** and keep it in a cool place. When the battery pack is installed to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery pack right before using the camcorder.

### The Switch on the Battery Pack

This switch is provided so that you can mark the charged battery pack. Set the switch to the "green mark" position when charging is completed **[c]**. (When removed from the charging adaptor, the switch exposes the green mark. When removed from your camcorder, no mark is indicated.)

### The Life of the Battery Pack

If the battery indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

### Charging Temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperatures require a longer charging time.

## Notes on Charging

### A Brand-new Battery Pack

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

### Recharge the Battery Pack Whenever You Like

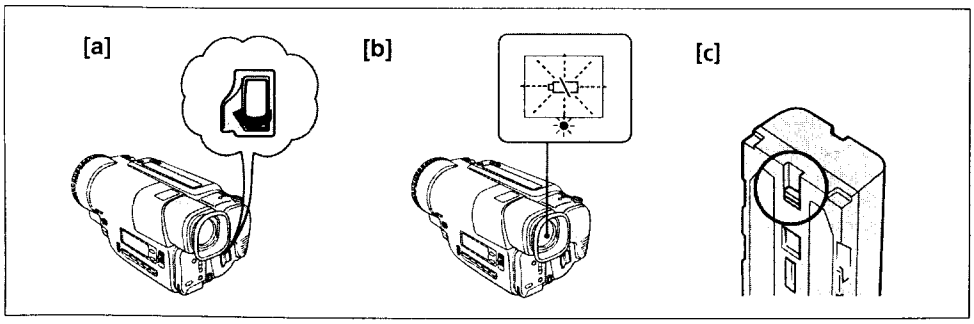
You do not have to discharge it before recharging. If you charged the battery pack fully but you did not use it for a long time, it becomes discharged. Then recharge the battery pack before use.

## Notes on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened. When the terminals are not clean or when the battery pack has not been used for a long time, repeatedly install and remove the battery pack. This improves the contact condition. Also, wipe the + and – terminals with a soft cloth or paper.

### Be Sure to Observe the Following

- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.



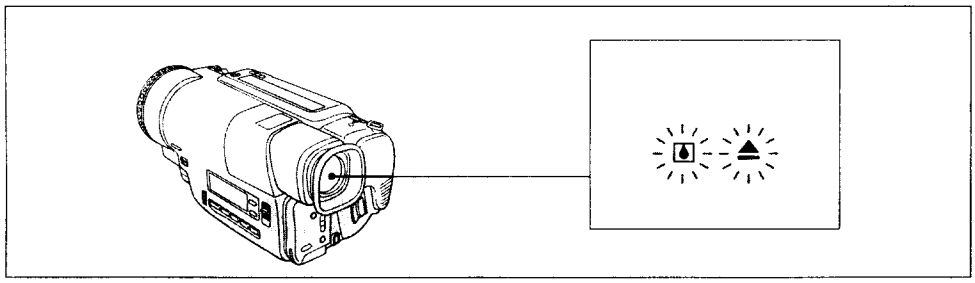
# Maintenance Information and Precautions

## Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

### Inside the Camcorder

When the 💧 and ⏏ indicators flash in the viewfinder, moisture has condensed inside the camcorder. If this happens, no other functions except for tape ejection will work.
**Eject the tape, turn off the camcorder and leave it with the cassette compartment open for at least one hour.** The camcorder can be used again if the 💧 indicator does not appear when the power is turned on again.



### On the Surface of the Tape

If there is moisture on the surface of the tape, when you insert the cassette and press a tape transport button (▷ PLAY, etc.), the ⏏ indicator in the viewfinder flashes. In this case, no other functions except for tape ejection will work.
**Eject the tape, turn off the camcorder and leave it with the cassette compartment open for at least one hour.** The camcorder can be used again if the ⏏ indicator does not appear when you insert the cassette and press one of the tape transport buttons.

### On the Lens

If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off the power and do not use the camcorder for about one hour.

### How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.
**(1)** Be sure to tightly seal the plastic bag containing the camcorder.
**(2)** Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about 1 hour).

## Video Head Cleaning

To ensure normal recording and clear pictures, clean the video heads. When the indicator and " CLEANING CASSETTE" message appear one after another in the viewfinder or playback pictures are "noisy" or hardly visible, the video heads may be dirty.

**[a]** Slightly dirty
**[b]** Very dirty

If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy," repeat the cleaning. (Do not repeat cleaning more than 5 times.)

### Caution

Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

### Note

If the V8-25CLH cleaning cassette is not available in your area, consult your nearest Sony dealer.

## Precautions

### Camcorder Operation

- Operate the camcorder on 7.2 V (battery pack) or 6.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid get inside the casing, unplug the camcorder and have it checked by Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF when not using the camcorder.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.

### On Handling Tapes

Do not insert anything in the small holes on the rear of the cassette. These holes are used to sense the type, thickness of tape or if the tab is out or in.

### Camcorder Care

- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth.
- Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

# Maintenance Information and Precautions

## AC Power Adaptor

### Charging

- Use only a lithium ion type battery pack.
- Charge the battery pack on a flat surface without vibration.
- The battery pack will get hot during charging. This is normal.

### Others

- Model for the USA and Canada: One blade of the plug is wider than the other for the purpose of safety and will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, contact your dealer.
- Unplug the unit from the wall (mains) outlet when not in use for a long time. To disconnect the cord (mains lead), pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the AC power cord forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If this happens, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- The unit becomes warm while in use. This is normal.
- Do not place the unit in locations that are:
  - Extremely hot or cold
  - Dusty or dirty
  - Very humid
  - Vibrating

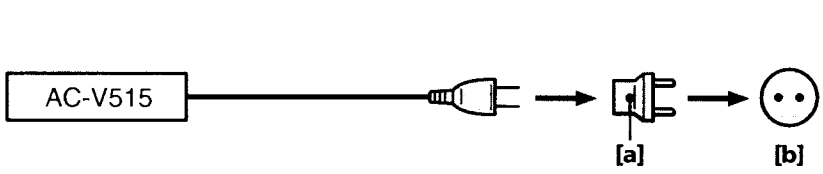
If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

# Using Your Camcorder Abroad

Each country has its own electric and TV color systems. Before using your camcorder abroad, check the following points.

## Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 100 V to 240 V AC, 50/60 Hz.
Use a commercially available AC plug adaptor **[a]**, if necessary, depending on the design of the wall outlet **[b]**.




## Difference in Color Systems

This camcorder is an NTSC system based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV.
Check the following list.

**NTSC system countries**
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

**PAL system countries**
Australia, Austria, Belgium, China, Denmark, Finland, Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

**PAL-M system country**
Brazil

**PAL-N system countries**
Argentina, Paraguay, Uruguay

**SECAM system countries**
Bulgaria, Czech Republic, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, Russia, Slovak Republic, Ukraine, etc.

# Trouble Check

If you run into any problem using the camcorder, use the following table to troubleshoot the problem. Should the difficulty persist, disconnect the power source and contact your Sony dealer or local authorized Sony service facility.

## Camcorder

| | Symptom | Cause | Corrective Actions | Page |
|---|---|---|---|---|
| Power | The power is not on. | The battery pack is not installed. | Install the battery pack. | 7 |
| | | The battery is dead. | Use a charged battery pack. | 6 |
| | | The AC power adaptor is not connected to a wall outlet. | Connect the AC power adaptor to a wall outlet. | 21 |
| | The power goes off. | While being operated in CAMERA mode, the camcorder has been in Standby mode for more than 5 minutes. | Close the STANDBY cover once and open it again. | 10 |
| | | The battery is dead. | Use a charged battery pack. | 6 |
| | | If the POWER SAVE switch is set to ON, the picture disappears automatically when you turn your face away from the viewfinder. | Bring your face close to the viewfinder within 1/2 inches (1 cm). | 9 |
| | | | Set it to OFF. | 10 |
| | The battery pack is quickly discharged. | The ambient temperature is too low. | — | 56 |
| | | The battery pack has not been charged fully. | Charge the battery pack again. | 6 |
| | | The battery pack is completely dead, and cannot be recharged. | Use another battery pack. | 57 |
| Operation | START/STOP does not operate. | The tape is stuck to the drum. | Eject the tape. | 8 |
| | | The tape has run out. | Rewind the tape or use a new one. | 17 |
| | | The POWER switch is set to VTR. | Set it to CAMERA. | 9 |
| | | The tab on the cassette is out (red). | Use a new tape or slide the tab. | 8 |
| | The cassette cannot be removed from the holder. | The battery is dead. | Use a charged battery pack or the AC power adaptor. | 6<br>21 |
| | No function except for cassette ejection works. | Moisture condensation has occurred. | Remove the cassette and leave the camcorder for at least an hour. | 58 |
| | The date or time indicator is flashing. | The lithium battery is weak or dead. | Replace the lithium battery with a new one. | 53 |
| | The tape does not move when a tape transport button is pressed. | The POWER switch is set to CAMERA or OFF. | Set it to VTR. | 17 |
| | | The tape has run out. | Rewind the tape or use a new one. | 17 |

| | Symptom | Cause | Corrective Actions | Page |
|---|---|---|---|---|
| Operation | The SteadyShot function does not activate. | STEADYSHOT is set OFF. | Set STEADYSHOT to ON. | 29 |
| | The autofocusing function does not work. | FOCUS is set to MANUAL. | Set it to AUTO. | 32 |
| | | Shooting conditions are not suitable for autofocus. | Set FOCUS to MANUAL to focus manually. | 31 |
| | No sound or only a low sound is heard when playing back a tape. | The stereo tape is played back with HiFi SND set to 1 or 2 in the menu system. | Set to STEREO in the menu system. | 24 |
| | Excessive high-pitched sound is heard. | The picture has been recorded with WIND set to ON in the menu system. | When there is no wind, set it to OFF. | 24 |
| | Nothing is seen nor heard when playing back after connecting the camcorder to the Handycam Station (Canadian model only). | An RFU adaptor is connected both to the camcorder and to the Handycam Station. | Remove the RFU adaptor connected to the camcorder. | — |
| Picture | The image on the viewfinder screen is not clear. | The viewfinder lens is not adjusted. | Adjust the viewfinder lens. | 10 |
| | A vertical band appears when a subject such as lights or a candle flame is shot against a dark background. | The contrast between the subject and background is too high. | The camcorder is not malfunctioning. Change locations. | — |
| | The menu is not displayed on the TV. | DISPLAY on the Remote Commander has not been pressed. | Press DISPLAY on the Remote Commander. | 17 |
| | The playback picture is not clear. | EDIT is set to ON in the menu system. | Set it to OFF. | 24 |
| | | The channel or input for the camcorder is not selected on the TV. | Select correctly. | — |
| | The picture is "noisy" or ✪ indicator and "CLEANING CASSETTE" message appear one after another in the viewfinder. | The video heads may be dirty. | Clean the heads using the Sony V8-25CLH cleaning cassette. | 59 |
| | The picture is too bright or too dark. | AE SHIFT is set in the menu system. | Set it to the center position. | 40 |
| | | VF BRIGHT is set in the menu system. | Set it to the center position. | 24 |

(to be continued)

## Trouble Check

| | Symptom | Cause | Corrective Actions | Page |
|---|---|---|---|---|
| Picture | The color of the playback picture is strange. | AUTO LOCK is set to the center position and a white balance indicator appears in the viewfinder. | Set it to AUTO LOCK. | 42 |
| | | Shooting conditions were not suitable for automatic white balance operation. | Adjust the white balance manually. | 41 |
| | The picture does not appear in the viewfinder. | If the POWER SAVE switch is set to ON, the picture disappears automatically when you turn your face away from the viewfinder. | Bring your face close to the viewfinder within 1/2 inches (1 cm). | 9 |
| | | | Set it to OFF. | 10 |
| | The picture in the viewfinder does not disappear even the POWER SAVE switch is set to ON. | Sunlight or the incandescent lamp may prevent the viewfinder sensor from working correctly. | This is not a malfunction. | — |
| | A vertical band appears when shooting a very bright subject. | — | The camcorder is not malfunctioning. | — |
| Others | The supplied Remote Commander does not work. | The HOLD switch is working. | Set the switch in the opposite direction of the arrow. | 17 |
| | | COMMANDER is set to OFF in the menu system. | Set it to ON. | 23 |
| | | Something is blocking the infrared rays. | Remove the obstacle. | — |
| | | The battery is not inserted with the correct polarity. | Insert the battery with the correct polarity. | 71 |
| | | The batteries are dead. | Insert new ones. | 71 |
| | The CHARGE lamp flashes after you charge the battery pack installed in the camcorder. | — | The camcorder is not malfunctioning. | — |
| | Bubbles appear inside the lens. | When you use the camcorder where the air pressure is low such as on a mountain or in an airplane, you may find bubbles inside the lens. | This is not a malfunction. Bubbles will usually disappear after about a week. But, how long it takes depends on the air pressure and use. | — |

## AC Power Adaptor

| | Symptom | Cause | Corrective Actions | Page |
|---|---|---|---|---|
| AC power adaptor | The VTR/CAMERA or CHARGE lamp does not light. | — | Disconnect the power cord. After about one minute, reconnect the power cord. | 7 |
| | The CHARGE lamp flashes. | See the following chart. | | |

### When the CHARGE Lamp Flashes

Check through the following chart.

Remove the battery pack from the AC power adaptor. Then install the same battery pack again.

**When the CHARGE lamp flashes again**
Install another battery pack.

**When the CHARGE lamp does not flash again**
If the charging status shown by the CHARGE lamp proceeds within 1 hour, there is no problem.

**When the CHARGE lamp flashes again**
The problem is with the AC power adaptor.

**When the CHARGE lamp does not flash again**
If the charging status shown by the CHARGE lamp proceeds within 1 hour, the problem is with the battery pack installed first.

Please contact your nearest Sony dealer in connection with the product with the problem.

# Specifications

## Video Camera Recorder

### System

**Video recording system**
Four rotary heads, Helical scanning FM system
**Audio recording system**
Rotary heads, FM system
**Video signal**
NTSC color, EIA standards
**Usable cassette**
8 mm video format cassette (Hi8 or standard 8 mm)
**Tape speed**
SP mode: Approx. 19/32 inches (1.43 cm)/second
LP mode: Approx. 5/16 inches (0.72 cm)/second (playback only)
**Recording time**
SP mode: 2 hours (E6/P6-120)
**Playback time**
SP mode: 2 hours (E6/P6-120)
LP mode: 4 hours (E6/P6-120)
**Fastforward/rewind time**
Approx. 8 min. (E6/P6-120)
**Image device**
CCD (Charge Coupled Device)
**Viewfinder**
Electronic viewfinder (color)
**Lens**
Combined power zoom lens, 32 x (Digital), 16 x (Optical)
Filter diameter 2 1/3 inches (52 mm), TTL autofocus system, inner focus wide macro system
**Focal distance**
3/16 – 2 3/4 inches (4.3 – 68.8 mm)
1 5/8 – 26 inches (41 – 656 mm) when converted to a 35 mm still camera
**Colour temperature**
Auto
HOLD, Indoor ☼ 3,200 K, Outdoor ☀ 5,800 K
**Minimum illumination**
2 lux at F1.6
**Illumination range**
2 lux to 100,000 lux
**Recommended illumination**
More than 100 lux

### Input and Output Connectors

**S video input/output**
4-pin mini DIN
Luminance signal: 1 Vp-p, 75 Ω, unbalanced, sync negative
Chrominance signal: 0.286 Vp-p, 75 Ω, unbalanced
**Video input/output**
Phono jack, 1 Vp-p, 75 Ω, unbalanced, sync negative
**Audio input/output**
Phono jacks (2: stereo L and R)
Input: 327 mV, input impedance more than 47 kΩ
Output: 327 mV,(at output impedance 47 kΩ)
impedance less than 2.2 kΩ
**RFU DC OUT**
Special minijack, DC 5 V
**Headphone jack**
Stereo minijack
**LANC control jack**
Stereo mini-minijack (ø 2.5 mm)
**MIC jack**
Minijack, 0.388 mV low impedance with 2.5 to 3.0 V DC, output impedance 6.8 kΩ (ø 3.5 mm)

### General

**Power requirements**
7.2 V (battery pack)
6.5 V (AC power adaptor)
**Average power consumption**
6.0 W during camera recording
**Installation**
Vertically, horizontally
**Operating temperature**
32°F to 104°F (0°C to 40°C)
**Storage temperature**
–4°F to +140°F (–20°C to +60°C)
**Dimensions (Approx.)**
4 x 4 1/8 x 8 1/8 inches (101 x 103 x 205 mm) (w/h/d)
**Mass (Approx.)**
1 lb 15 oz (900 g) excluding the battery pack, lithium battery, cassette, lens cap and shoulder strap
2 lb 5 oz (1,050 g) including the battery pack NP-520, lithium battery CR2025, cassette E6/P6-120, lens cap and shoulder strap
**Microphone**
Electret condenser microphone, stereo type
**Supplied accessories**
See page 5.

## AC power adaptor

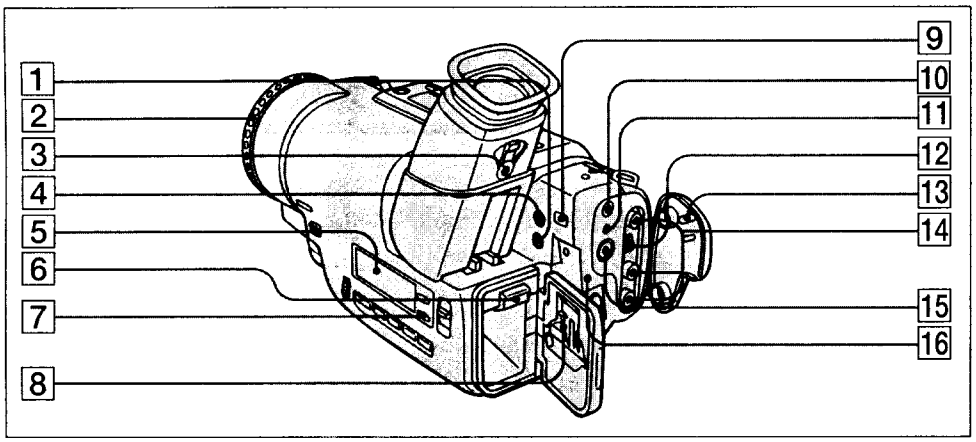
**Power requirements**
100 – 240 V AC, 50/60 Hz
**Power consumption**
22 W
**Output voltage**
DC OUT: 6.5 V, 2.0 A
in operating mode
Battery charge terminal: 8.4 V, 1.4 A in charge mode
**Application**
Sony battery packs NP-520, NP-500H, NP-720 lithium ion type
**Operating temperature**
32°F to 104°F (0°C to 40°C)
**Storage temperature**
–4°F to +140°F (–20°C to +60°C)
**Dimensions (Approx.)**
2 4/5 x 1 3/4 x 3 3/4 inches (72 x 44 x 96 mm) (w/h/d) including projecting parts and controls
**Mass (Approx.)**
11 oz (300 g)

## Handycam Station (for Canadian model only)

**S video/Video/Audio input/output**
Same specifications as video camera recorder
**RFU DC OUT**
Same specifications as video camera recorder
**LANC control jack**
Stereo mini-minijack (ø 2.5 mm)
**Handycam Station Terminal**
20 pin special connector
**Operating temperature/ Storage temperature**
Same specifications as video camera recorder
**Dimensions (Approx.)**
6 1/8 x 1 13/16 x 6 1/2 inches (153 x 45 x 163 mm) (w/h/d)
**Mass (Approx.)**
12 oz (340 g)

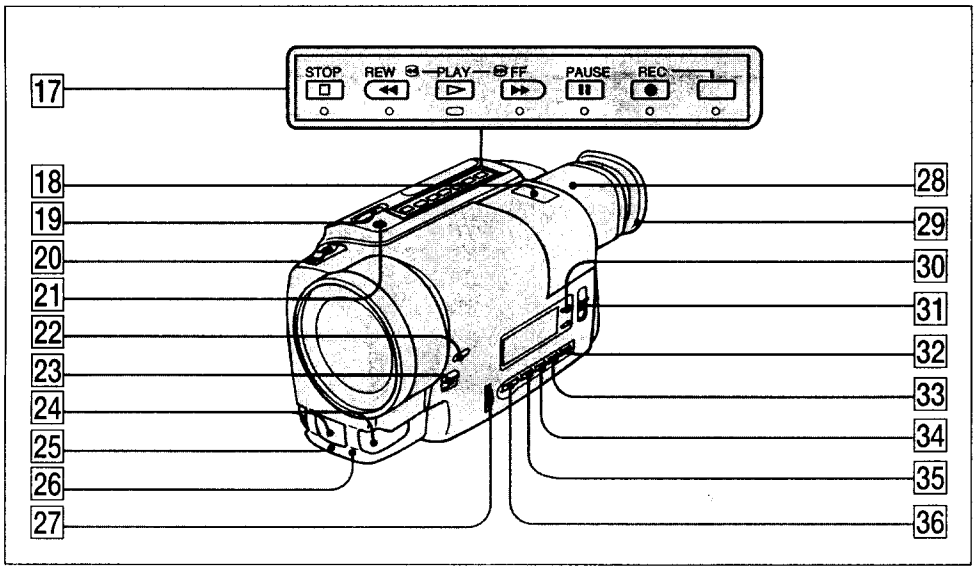
Design and specifications are subject to change without notice.

# Identifying the Parts




1 **TIME button** (p. 19, 27)
2 **Focus ring** (p. 31)
3 **Viewfinder lens adjustment lever** (p. 10)
4 **DATE button** (p. 19, 27)
5 **Display window** (p. 73)
6 **Battery release lever** (p. 7)
7 **INDEX MARK button** (p. 44)
8 **Lithium battery compartment** (p. 53)
9 **STEADYSHOT switch** (p. 29)
10 **(headphones) jack** (p. 13)
11 **LANC control jack**
stands for Local Application Control Bus System. The control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.
12 **RFU DC OUT (RFU adaptor DC output) jack**
13 **Jack cover**
14 **VIDEO/AUDIO jacks** (p. 14)
15 **S VIDEO jack** (p. 14)
16 **Camera recording/battery lamp** (p. 9)

## Identifying the Parts




17 **Tape transport buttons** (p. 17, 18)
- □ STOP (stop)
- ◀◀ REW (rewind)
- ▷ PLAY (playback)
- ▶▶ FF (fastforward)
- ❚❚ PAUSE (pause)
- ● REC (recording)

18 **Lighting aperture**

19 **EDITSEARCH button** (p. 13)

20 **POWER switch** (p. 9, 17)

21 **END SEARCH button** (p. 20)

22 **FADER button** (p. 25)

23 **FOCUS switch** (p. 31)

24 **Built-in microphone**

25 **Remote sensor** (p. 72)
Aim the Remote Commander here for remote control.

26 **Camera recording/battery lamp** (p. 9)

27 **CONTROL dial** (p. 36)

28 **Viewfinder** (p. 10)

29 **Eyecup** (p. 12)

30 **COUNTER RESET button** (p. 10)

31 **AUTO LOCK switch** (p. 32, 36)

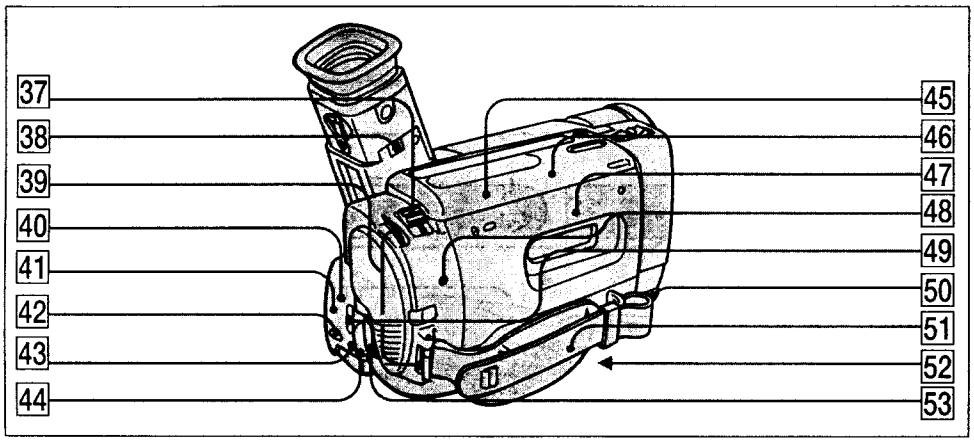
32 **WHT BAL (white balance) button** (p. 41)

33 **GAIN button** (p. 36)

34 **SHUTTER SPEED button** (p. 36)

35 **IRIS button** (p. 36)

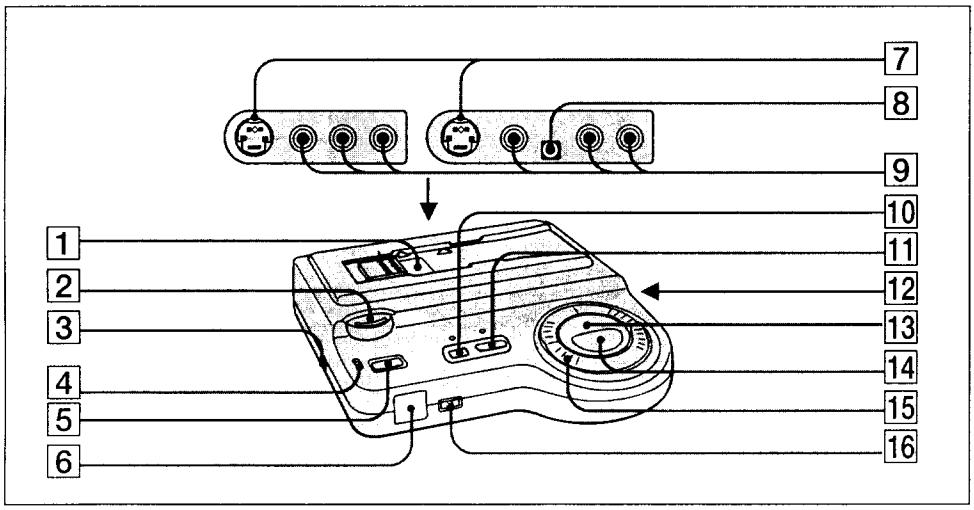
36 **PROGRAM AE button** (p. 32)




37 **Power zoom lever** (p. 11)
38 **POWER SAVE switch** (p. 10)
39 **Hooks for shoulder strap** (p. 73)
40 **MENU button** (p. 23)
41 **Battery compartment** (p. 7)
42 **PICTURE EFFECT button** (p. 26)
43 **EXECUTE button** (p. 23)
44 **STANDBY cover** (p. 9)
45 **⏏ (Eject) button (under the lid)** (p. 8)
46 **Cassette compartment lid** (p. 8)
47 **Cassette compartment** (p. 8)
48 **CHARGE lamp** (p. 16)
49 **▲ (+) and ▼ (–) buttons** (p. 23)
50 **MIC jack (PLUG IN POWER)**
Connect an external microphone (not supplied). This jack also accepts a "plug-in-power" microphone.
51 **Grip strap** (p. 12)
52 **Tripod receptacle** (p. 12)
53 **START/STOP button** (p. 9)

## Identifying the Parts

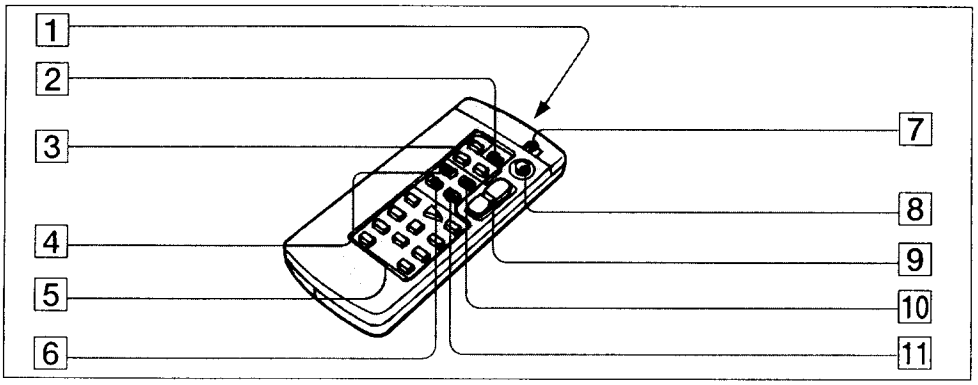
### Handycam Station (supplied for Canadian model only)




1 Camcorder mounting surface (p. 16)
2 RELEASE button (p. 16)
3 LANC control jack
4 HANDYCAM POWER lamp
5 HANDYCAM POWER switch
6 Remote sensor
7 S VIDEO jacks (p. 15)
8 RFU DC OUT (RFU adaptor DC output) jack
9 VIDEO/AUDIO jacks (p. 15)
10 ● REC (recording) button
11 ❚❚ PAUSE (pause) button
12 Terminal for the connecting plate (p. 16)
13 ▷ PLAY (playback) button
14 ■ STOP (stop) button
15 Shuttle ring (p. 17)
16 COMMAND MODE selector (p. 17)

## Remote Commander

The buttons that have the same name on the Remote Commander as on the camcorder function identically.




1 **Transmitter**
Point toward the remote sensor to control the camcorder after turning on the camcorder.

2 **DISPLAY button**

3 **INDEX buttons**
INDEX button (p. 46, 47)
INDEX MARK button (p. 44)
INDEX ERASE button (p. 45)

4 **TIME CODE WRITE button** (p. 48)

5 **Tape transport buttons** (p. 17, 18)

6 **COUNTER RESET button**

7 **HOLD switch**
Slide this switch in the direction of the arrow to prevent the buttons from being accidentally pressed.
**Before using this Remote Commander, slide in the direction opposite to the arrow.**

8 **START/STOP button**

9 **Power zoom button**

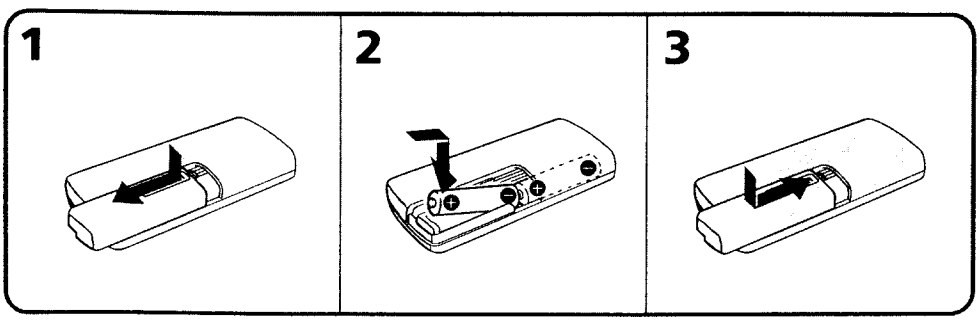
10 **DATA CODE button** (p. 19)

11 **ZERO MEM button** (p. 28, 43, 52)

### To prepare the Remote Commander

To use the Remote Commander, you must insert two size AA (R6) batteries. Use the supplied size AA (R6) batteries.

**(1)** Remove the battery cover from the Remote Commander.
**(2)** Insert both of the size AA (R6) batteries with correct polarity.
**(3)** Put the battery cover back onto the Remote Commander.



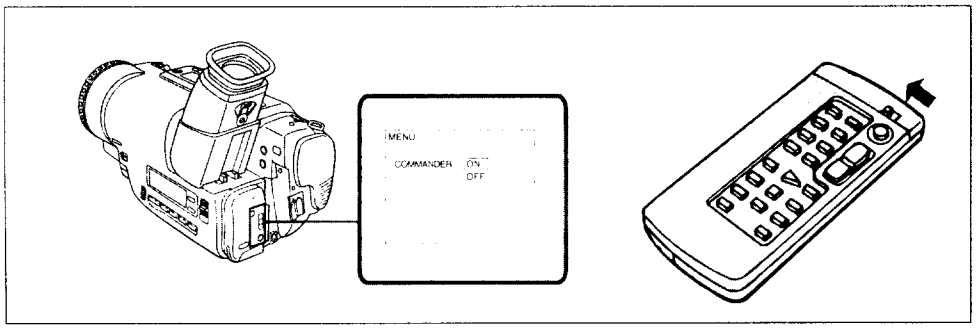
# Identifying the Parts

**Note on battery life**
The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

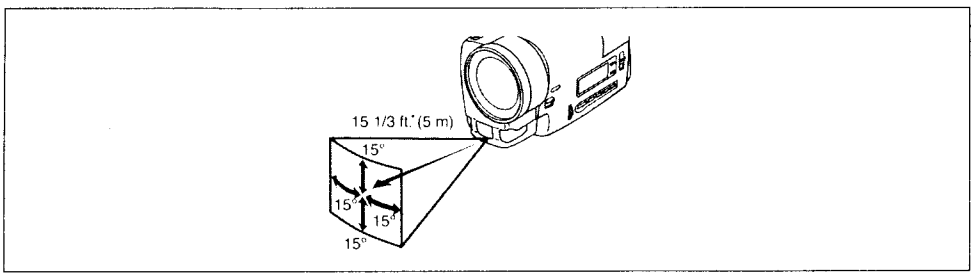
**To avoid damage from possible battery leakage**
Remove the batteries when you will not use the Remote Commander for a long time.

## To Use the Remote Commander

Make sure that the COMMANDER is set to ON in the menu system on the camcorder, and that the HOLD switch on the Remote Commander is not working.
When using the Handycam Station (supplied for Canadian model only), set COMMAND MODE to VTR 2 and aim the Remote Commander at the remote sensor on the Handycam Station.




## Remote Control Direction

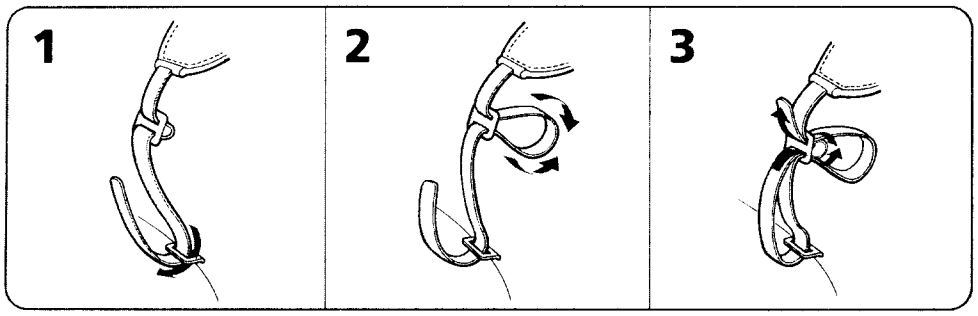



**Notes on the Remote Commander**

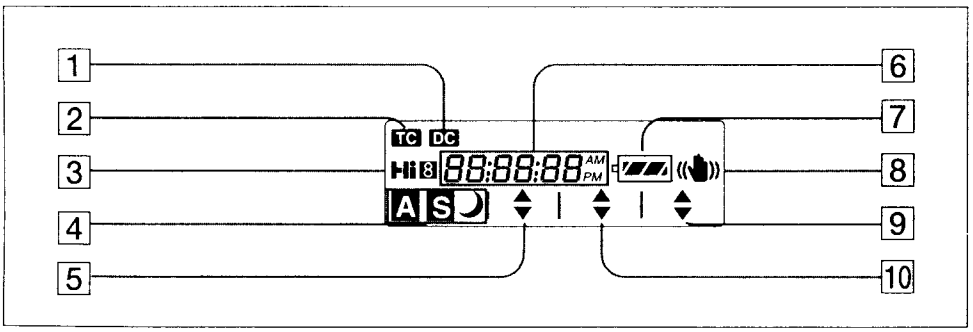
- Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- This camcorder works at commander mode VTR 2. The commander modes (1, 2 and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

## Attaching the Shoulder Strap

Attach the supplied shoulder strap to the hooks for the shoulder strap (p. 69).




## In the Display Window




1 **Data Code indicator** (p. 19)
Lights up when displaying the date or time when you recorded (Data Code).

2 **RC time code indicator**
Lights up when displaying the RC time code.

3 **Playing back or recording in Hi8 format**

4 **PROGRAM AE indicators** (p. 32)

5 **Aperture adjustment indicator** (p. 36)

6 **Date or time/Tape counter/Time code indicator** (p. 10, 27, 48)

7 **Remaining battery indicator** (p. 56)

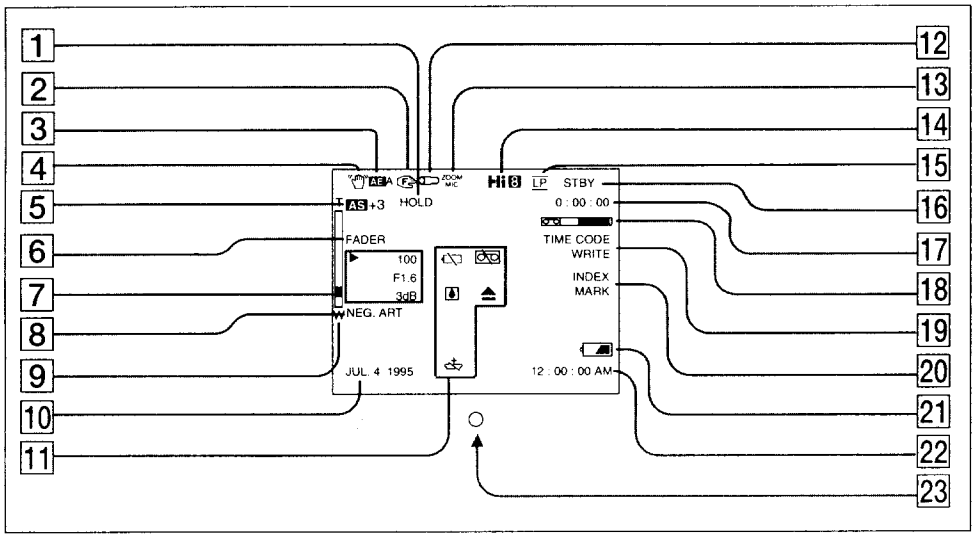
8 **SteadyShot indicator** (p. 29)

9 **Gain adjustment indicator** (p. 36)

10 **Shutter speed adjustment indicator** (p. 36)

# Identifying the Parts

## In the Viewfinder




1 White balance indicator (p. 41)
2 Manual focusing (p. 31)
3 PROGRAM AE indicator (p. 32)
4 SteadyShot indicator (p. 29)
5 AE Shift indicator (p. 40)
6 FADER indicator (p. 25)
7 Power zoom indicator (p. 11)
8 PICTURE EFFECT indicator (p. 26)
9 Manual adjustment indicator (p. 36)
10 Data Code indicator (p. 19)
11 Warning indicators (p. 75)
12 WIND indicator (p. 24)
13 ZOOM MIC indicator (p. 24)
14 Playing back or recording in Hi8 format
15 Lights up when playing back a tape recorded in LP mode. (p. 55)
16 Tape transport mode
17 Tape counter/RC time code indicator (p. 10, 48)
18 Remaining tape indicator

→ → → 5min → 0min

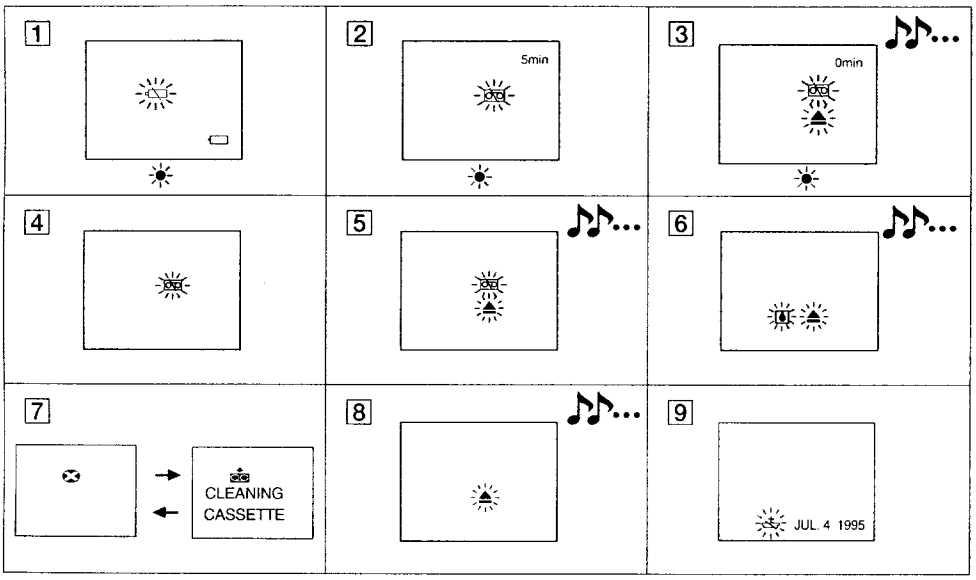
19 TIME CODE WRITE indicator/ ZERO MEM indicator (p. 28, 43, 48)
20 Index indicator (p. 44, 46, 47)
21 Remaining battery indicator (p. 56)

→ → → →

22 Date or Time indicator (p. 27)
23 Recording lamp/Battery lamp

# Warning Indicators

If indicators flash in the viewfinder or in the display window, check the following:
♪: you can hear the beep sound when the BEEP is set to ON.




1 **The battery is weak or dead.**
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.

2 **The tape is near the end.**
The flashing is slow.

3 **The tape has run out.**
The flashing becomes rapid.

4 **No tape has been inserted.**

5 **The tab on the tape is out (red).**

6 **Moisture condensation has occurred.** (p. 58)

7 **The video heads may be contaminated.** (p. 59)
This indicator appears only on the viewfinder.

8 **Some other trouble has occurred.**
Disconnect the power source and contact your Sony dealer or local authorized facility.

9 **The lithium battery is weak or is not installed.** (p. 53)

# Index


## A, B

AC power adaptor ..... 6, 21
Adjusting viewfinder ..... 10
AE Shift ..... 40
AFM HiFi Sound ..... 55
Aperture ..... 35
Aperture priority mode ..... 33
Auto focus ..... 32
Automatic adjustment ..... 30
A/V connecting cable .... 14, 15
Battery pack ..... 6
BEEP ..... 10

## C, D

Camera recording ..... 9
Car battery ..... 22
Charging battery ..... 6
Cleaning video heads ..... 59
Clock set ..... 54
Connection ..... 14 – 16
COUNTER RESET ..... 10
Data code ..... 19
DATE/TIME ..... 27
Digital zoom ..... 11
DISPLAY ..... 17

## E

EDIT ..... 49
Editing ..... 49, 51
EDITSEARCH ..... 13
END SEARCH ..... 20
Eject (⏏) ..... 8

## F

Fade-in/Fade-out ..... 25
FADER ..... 25
Fastforward ..... 17

## G, H, I, J, K, L

Gain ..... 35
Index ..... 44 – 47
LANC ..... 67
Lithium battery ..... 53

## M, N

Manual adjustment ..... 30
Manual focus ..... 31
Menu system ..... 23
M. FADER ..... 25
MIC (microphone) jack ..... 69

## O, P

PICTURE EFFECT ..... 26
Playback on TV ..... 17
Playback pause ..... 18
Power sources ..... 21
Power zoom ..... 11
PROGRAM AE ..... 32
PUSH AUTO ..... 32

## Q, R

RC time code ..... 23, 48
REC ..... 51
Rec review ..... 13
Remote Commander ..... 71
Remote control jack ..... 67
Reverse ..... 18
Rewind ..... 17

## S

Shoulder strap ..... 73
Shutter priority mode ..... 34
Shutter speed ..... 35
Skip scan ..... 18
STANDBY ..... 9
Standby mode ..... 9
STEADYSHOT ..... 29
Supplied accessories ..... 5

## T, U, V

Tape counter ..... 10, 73, 74
Time code ..... 23, 48
Tripod mounting ..... 12
Trouble check ..... 62
Twilight mode ..... 35

## W, X, Y, Z

White balance ..... 41
WIND ..... 24
Zero memory ..... 28, 43
Zoom ..... 11
ZOOM MIC ..... 24


Sony Corporation Printed in Japan